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High-pressure Boilers

IS A MODIFICATION OF POLICY NEEDED ?

IN the inaugural address at Leeds of the new chairman of the I.E.E. North-Midland Centre, to which there is further reference on another page, there are texts for several sermons. For the past quarter of a century Mr. Rylands has been concerned chiefly with the fuel economy aspect of power generation, so he naturally mentioned the already high efficiency of the steam boiler portion of an electricity generating unit.

Design and Efficiency

By modifying the design in certain ways the boiler efficiency can be raised a little. The resulting improvement of average overall efficiency in the utilization of coal for power production will be very small and, moreover, the slight betterment is not only expensive to obtain but can lead to plenty of difficulties in terms of boiler availability.

The urge to secure the highest operating efficiency has accentuated the risk of corrosion at the economizer and air heater end of the plant and, at the same time, delayed the delivery of new boilers by necessitating the modification of manufacturing methods for producing boilers to work at the highest pressures and temperatures.

In this connection we may mention an important power station which is now being reconstructed which is to produce steam at 1,400 lb/sq in and 960 deg F at the superheater outlet, among the highest in this country. Nevertheless, in order to ensure the service availability of the plant as a whole, the turbine is designed to be modified for 925 lb/sq in and 920 deg F, the full output of both boiler (the largest in Britain) and turbine is to be obtainable at either pressure and temperature.

This case of prudence in practice interrupting the pursuit of a principle raises the question whether the time is not opportune to consider a change of policy. To strive for the ultimate increment of efficiency may be correct in circumstances other than those in which maximum plant availability must be the first consideration. But the benefits immediately obtainable that way are small, as already mentioned, and divergence from the path hitherto followed need not, as the example quoted indicates, necessarily mean loss of power output.

Temporary Moderation

If, therefore, restriction of the demand for plant of advanced design could hasten the manufacture and installation of boilers and turbines to operate at lower temperatures and pressures, it would merit serious consideration as a possible means of helping more quickly to close the gap between installed plant capacity and mounting peak.

The burdened climber who finds himself taking one step upward and slipping two downward usually has to shorten his stride in order to make the ascent. By agreeing to the limitation of high pressure generating plant temporarily, or even forgoing it altogether for the time

being, power engineers will not permanently hamper development. They may, however, in this way lighten the task of tube makers who specialize in high pressure equipment and encourage more manufacturers to help to fill the gap, at the same time simplifying boiler erection on site, because high pressure tubes cannot be factory shaped in one piece for large boilers.

The choice is one of two evils; the merit of high-pressure plant is a minority interest, whereas the majority concern is for more electricity—as quickly as it can be obtained. It only needs this or next winter to be a severe one, in the present state of the country, to turn a misfortune into a calamity.

IMPORT RELAXATION

THE announcement by Mr. Harold Wilson of the Government's decision to issue open general licences for the importation of a wide range of goods, including electrical equipment, immediately conjured up fears of a spate of cheap foreign appliances upon the British market. Examination of the details shows, however, that there is little danger of this so far as electrical apparatus is concerned. While it is true that a great variety of equipment is covered in the published lists—from boilers and turbines to kettles—most of the countries from which a flood might be expected are excepted from the arrangement. The United States and Canada, of course, are naturally excluded, but so are Germany, Japan, Switzerland, Belgium, Hungary, and Czechoslovakia. With the possible exceptions of the Scandinavian countries and France it is difficult to see where the unrestricted goods are likely to come from. It is noteworthy that electric cookers, fires and refrigerators are not in the "open" list anyway.

THEFTS IN TRANSIT

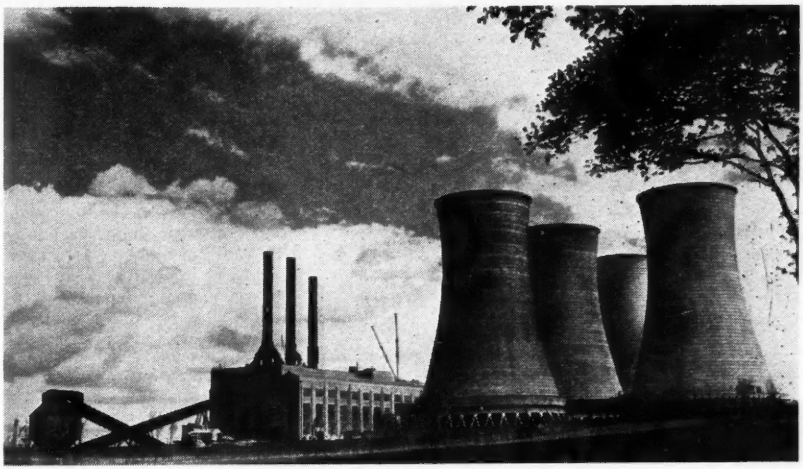
IMMENSE amounts of goods are lost each year by thefts in the course of transportation. It is not only the loss of the goods which affects business concerns for the value is often recoverable. It is the annoyance caused to customers with the consequent loss of goodwill which may be more harmful. The subject was considered at a conference called by the London Chamber of Commerce last year and as a result a Co-ordinating Committee of the organizations represented was set up. This Committee has just published a booklet "Pilferage," in which it sets out in an exhaustive manner the many measures which manufacturers can take to reduce loss by theft. Correct packing is probably the best way and for this reason the Committee devotes much of the space to this aspect. Goods for export offer much greater opportunity to pilferers and a separate section on this subject is included. The Committee has rendered a useful service to the trading community.

EXTRA PROFITS TAX

THERE is little to be said in favour of the rise in the distributed profits tax from 25 to 30 per cent announced by the Chancellor of the Exchequer last week. In the first place the raising of a tax between Budgets is a practice to be deprecated. Secondly, the increase will apply equally to extra payments of dividend arising from devaluation profits made by some concerns and to the distributions of companies who are no better off as a result of the currency manipulation. As a "gesture" towards the trade unions to dissuade them from making wage claims, it is of doubtful effect.

TROPICAL CONDITIONS

IN a communication to the September *I.E.E. Journal* relating to telephone equipment for the tropics, Sir Norman Frome emphasizes the ill effects of dust. His remarks are valid with regard to other types of electrical apparatus also. Exclusion of dust increases the problems associated with ventilation in high ambient temperatures. On the other hand the presence of dust is apt to lessen the value of the stringent insulation-resistance works tests usually specified, since it promotes condensation by providing nuclei for the formation of drops of moisture and facilitates their coalescence to provide leakage paths. The need for robust designs that facilitate maintenance, to which the author draws attention, is unlikely to be any the less with the present tendency towards national self-sufficiency in many tropical countries.



Walsall Power Station

FIRST TWO SETS ON LOAD

IN November, 1944, a direction for the construction of the first section of a new generating station at Birchills, Walsall, was given to the West Midlands Joint Electricity Authority by the Central Electricity Board. This provided for the installation of two 30 MW turbo-alternator sets and associated equipment, which are now on load and were officially inaugurated on Friday last, September 30th, by the Mayor of Walsall, Councillor T. P. Riley, J.P. During the next few years, however, it was decided to add another two similar sections to bring the total output of the station up to 180 MW.

Originally, the first section of the station was planned for completion in 1948, the second in 1949 and the third by 1951. Unforeseen difficulties, due to site conditions, delayed completion of the first section now inaugurated, but work on the second section is well advanced and it is estimated that it will be in commission early next year. Owing to the Government restrictions on capital expenditure, however, the date for completion of the third section has been postponed until 1952.

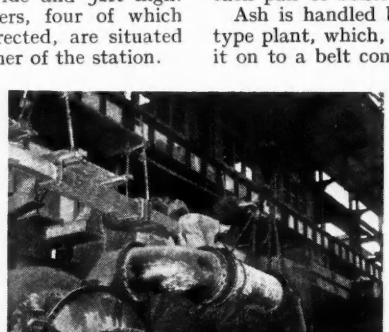
The station is situated about a mile to the north of the town on a strip of land adjacent to the old Birchills station. The Walsall to Wolverhampton railway adjoins the site, as does the Wyrley and Essington canal, so with road access available there are adequate supply facilities. There is, however, a disadvantage to the site because the area is riddled with disused mine workings and during the preliminary excavations several old pit shafts were disclosed. Consequently, the foundations for the switch house and office block, turbine house and boiler house are designed as rafts or strip footings and no isolated foundations are used at all.

The completed turbine room is 650ft long by 67ft wide and 70ft high. Parallel to this runs an auxiliary plant bay of the same length but 25ft wide and 63ft high. Between it and the boiler

house is a switch annexe 500ft long, 25ft wide and 63ft high. The boiler house itself, which is on the north side of the site by the railway, is 408ft long, 116ft wide and 99ft high. The switch house and office block, which is connected to the main buildings by a suspended road, is 431ft long, 54ft wide and 52ft high. The six cooling towers, four of which have already been erected, are situated at the south west corner of the station.

For fuel the station uses local coal with a calorific value of about 9,000 B.Th.U./lb, storage space for 135,000 tons being provided just beyond the cooling towers. Rail-borne coal is handled in a tippler house, from which it can be transported either to the storage dump by means of a travelling crane or direct to the boiler bunkers by a reversible conveyor.

Coal from canal barges is handled by two electrically operated unloaders and delivered into a receiving hopper whence it is fed by means of conveyors to the bunkers.



Erecting the circulating pipework associated with the condensing plant

Steam-raising Plant

The boiler house will ultimately contain twelve Babcock & Wilcox "Highhead" boilers equipped with B. & W. style 28-chain grate stokers arranged in pairs one on each side of a central firing aisle running the length of the station. There is one coal hopper for each pair of boilers, which is, in turn, associated with one turbo-alternator, although full steam interconnections are provided.

The boilers have Bailey water-cooled walls and are designed to have a normal evaporative capacity of 150,000 lb/hr and a maximum capacity of 180,000 lb/hr, steam conditions at the stop valve being 650 lb/sq in at 875 deg F. Each boiler is furnished with two Howden induced draught fans, two forced draught fans and two secondary air fans together with a B. & W. superheater and economiser and Howden-Ljungstrom air heaters.

Owing to the foundation difficulties already mentioned it was deemed inadvisable to erect brick chimneys, so lined steel chimneys were constructed, one for each pair of boilers.

Ash is handled by a B. & W. paddle type plant, which, after quenching, feeds it on to a belt conveyor under each line of boilers. It is then taken by another conveyor to a storage bunker with a capacity of 688 tons whence it is hauled in tipping wagons to the low land west of the station.

Turbo-Alternators

Ultimately there will be six 30,000 kW B.T.H. turbo-alternators in the turbine house, disposed longitudinally down the length of the building in pairs; i.e., with the steam ends of each pair facing each other. They are designed to run at 3,000 r.p.m. and to operate with steam at 600 lb/sq in and 850 deg F, exhausting to the condensers at a vacuum of 28.55 in Hg when running at maximum continuous rating with circulating water at an inlet temperature of 70 deg F.

The turbines are of two-cylinder double-flow impulse-reaction construction, having 22 stages in the h.p. cylinder and seven double-flow stages in the l.p. cylinder. The alternators generate at 33/36 kV, having a rating of 37.5 MVA at 0.8 power factor and an inherent internal impedance of 18.3 per cent. Each machine is equipped with twin condensers, each having a net cooling surface of 35,000 sq ft and being supplied with 27,500 gallons of cooling water per minute. The circulating water is supplied by two Drysdale pumps each capable of delivering 16,900 gallons/minute, which is 60 per cent of the quan-

tity required for full load on the turbine.

The condensate is pumped by "Hi-Vac" extraction pumps through the air ejectors, gland steam condenser, drain cooler and low-pressure feed heater to the suction main of the feed pumps. There are three of these to each turbine, two electrically and one steam driven, which deliver through three high-pressure heaters into the duplicate main feed ranges at 340 deg F with full load on the machine.

The make-up water is taken from the town mains and as this has a hardness of about 15 deg it is treated in a Permutit base exchange softening plant and then evaporated in "P. & B" evaporating plants, four of which will be installed, one being a standby. Each evaporator can supply 15,000 lb/hr and this is passed to the reserve tanks which are all interconnected by bus mains.

The 240ft high concrete cooling towers handling the condenser circulating water are supplied with make-up water from the nearby canal. The diameter of the ring beam at the base of each tower is 165ft 6in, the throat and top diameters being 89ft and 100ft respectively. Each one of them is designed to cool 1,600,000 gal/hr through a range of 12 deg F with an inlet temperature of 87.4 deg F and humidity 70 per cent.

Auxiliary Power

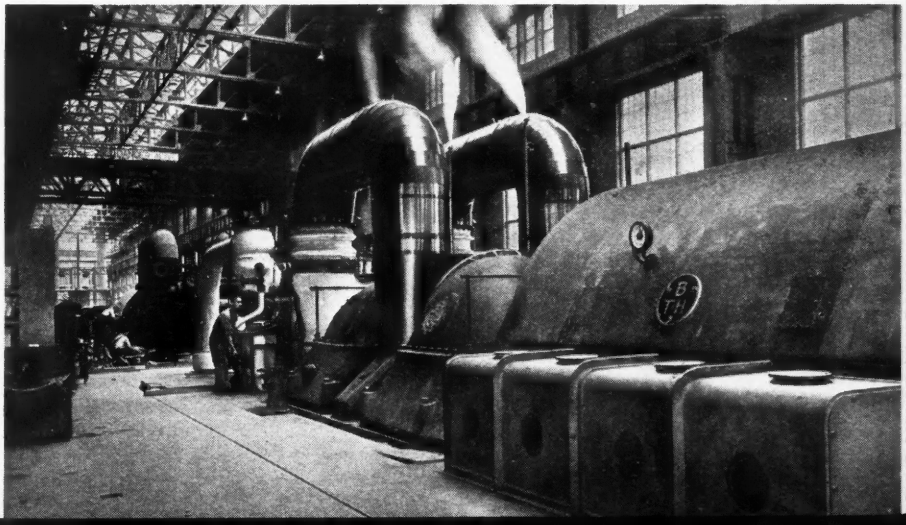
Power for operating the station auxiliaries is supplied by transformers connected to the main 33 kV busbars.

No. 1 boiler and control panel at firing floor level

Motors of more than 50 h.p. are fed from a 3,300 V three-phase three-wire system and smaller motors, lighting and heating from a 415/240 V three-phase four-wire system. For this purpose the completed installation will comprise four 5,000 kVA 33/3.3 kV and six 750 kVA 3.3 kV/415 V transformers.

Six separate switch rooms are provided to segregate the 3.3 kV and 415 V switchgear, supplied by George Ellison, Ltd., to feed the auxiliaries for one turbo-alternator and the two associated boilers. These switch rooms are in an annexe between the boiler house and turbine room. Electrical interconnection between the sections is by bus section switches housed in separate brick-built chambers. As an additional safeguard against fire

One of the 30 MW turbo-alternators



damage an automatic CO_2 fire-fighting scheme is to be installed.

For emergency lighting and switch closing supplies a 230 V 1,200 Ah lead-acid battery and associated charging equipment has been installed. Lighting throughout the station is by tungsten filament lamps and the wiring is carried out with Pyrotenax mineral insulated cable.

Switchgear

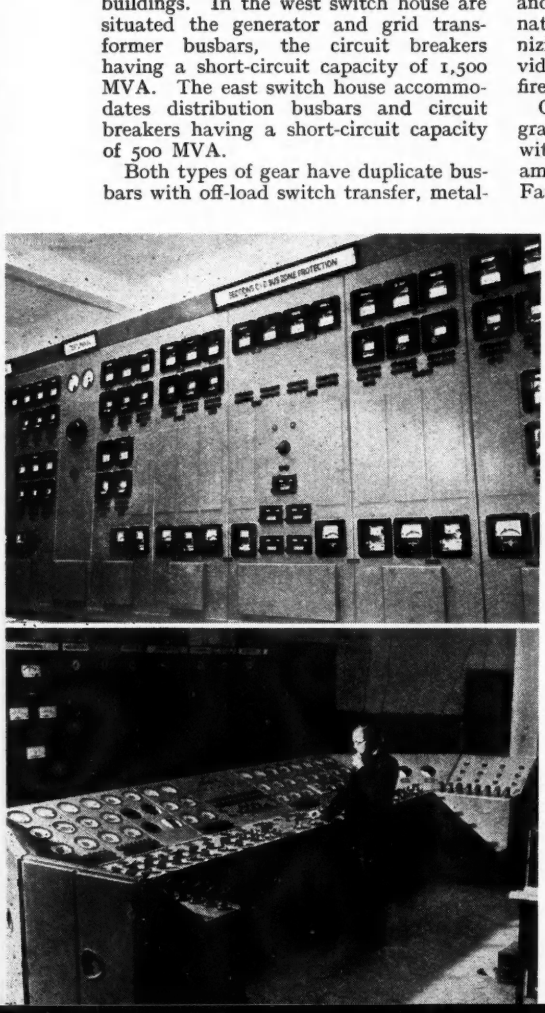
The main 33 kV switchgear is of Ferguson, Pailin, Ltd., manufacture, and is divided into two groups which are situated in the wings of the office block between the cooling towers and the main buildings. In the west switch house are situated the generator and grid transformer busbars, the circuit breakers having a short-circuit capacity of 1,500 MVA. The east switch house accommodates distribution busbars and circuit breakers having a short-circuit capacity of 500 MVA.

Both types of gear have duplicate busbars with off-load switch transfer, metal-clad phase separation with condenser bushings and low-oil-content circuit breakers. Eighteen switches will eventually be accommodated on the generator busbars, six for the alternators, two for the grid transformers, four interconnectors, and two bus couplers with the bus section switch. Here again the two sections of switchgear are separated by walls built on either side of the bus-section switch to act as fire breaks.

Control Room

The control room, which is situated in the centre of the main switch house, is equipped with a central desk from which can be carried out the voltage, current and load adjustments of the turbo-alternators and grid transformers. Synchronizing and telephone services are also provided, together with a non-trip alarm and fire annunciator system.

On two sides of the main desk are diagrammatic indicator panels furnished with mimic busbars, switch signals and ammeters to show current distribution. Fault annunciators are provided for the individual circuits, the protective relays being mounted at the rear of the boards. On a raised dais in the wings of the control room are the 1,500 and 500 MVA busbar zone protective panels, a feature of which is that they are equipped with built-in testing arrangements and metering equipment.



Grid Connection

Connection to the grid will be made by two English Electric 132/33 kV, 75 MVA transformers provided with on-load tap changing gear. They are to be installed in a sub-station to the north of the station railway sidings, a small building also being provided to house various protective relays and auxiliary apparatus.

The lower voltage connection to the generating station busbars will be by means of underground cable and two 33 kV 1,500 MVA Ferguson Pailin oil circuit breakers, the high-voltage side of the trans-

Bus zone protective panel incorporating testing arrangements, and (below) central desk in control room

formers being connected directly to 132 kV transmission lines running to the grid sub-station at Willenhall, about 4½ miles away.

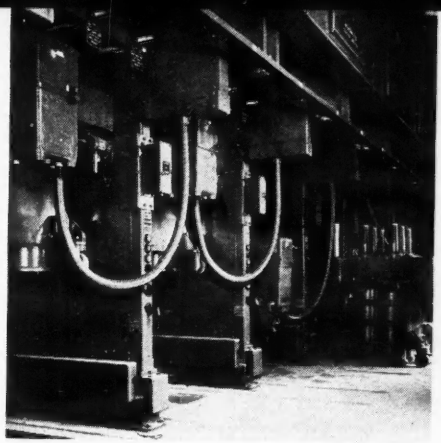
As a temporary measure a 132/33 kV 30 MVA transformer has been installed in the sub-station and is connected to the generating station as a means of dealing with part of the output of the station in the early stages.

Principal Contractors

Among the contractors for the station were Babcock & Wilcox, Ltd., steam-raising plant; British Thomson-Houston Co., Ltd., turbo-alternators and turbine room motor drives; Drysdale & Co., Ltd., and G. & J. Weir, Ltd., pumps; Hick, Hargreaves & Co., Ltd., condensers, ejectors, feed heaters and extraction pumps; George Kent, Ltd., turbine and boiler instrument panels; Lancashire Dynamo & Crypto, Ltd., boiler house motors; Aiton & Co., Ltd., evaporators, main steam and feed pipework; Mitchell Engineering, Ltd., coal-handling plant; Ferguson, Pailin, Ltd., main 33 kV switchgear; George Ellison, Ltd., auxiliary supplies switchgear and starters for 3·3 kV and 400 V motors; British Electric Transformer Co., Ltd., works transformers; Chloride Electrical Storage Co., Ltd., emergency and general service battery. The foundation work and superstructure were handled by Sir Alfred McAlpine & Son, Ltd., and the cooling towers were erected by the Mitchell Construction Co., Ltd.

Inauguration of Plant

After the opening ceremony at the new station an inaugural luncheon was held at Walsall Town Hall. Proposing the toast "The British Electricity Authority," Councillor T. P. Riley, Mayor of Walsall, said that the new station marked another milestone on the road to reducing the power shortage. He also referred to the beauty of the rock gardens surrounding the cooling towers and said that in view of the research which was at present being carried out it might be possible before long to reduce the amount of vapour given off by the towers. This would be a good thing as it was proposed to build 2,000 houses and two schools in the vicinity. The new station was a credit to the West Midlands J.E.A., which was responsible for its inception.



Main 1,500 MVA switchgear; No. 1 alternator switch in foreground

In reply, Mr. F. W. Lawton (Controller, Midlands Division, B.E.A.) said that the planning of a power station was no mean task and when it was built the technical interest moved from construction to operation, the success of which depended on team work. He thanked those responsible for bringing the Walsall station into being and said that nationalization had brought a new concept to the electricity supply industry as technical information regarding design and operation was now freely available to all.

Other toasts were "The Guests," proposed by Mr. L. F. Jeffery (B.E.A.) and responded to by Mr. C. H. Sparkes (Babcock & Wilcox, Ltd.), and Mr. J. S. Ramsden (British Thomson-Houston Co., Ltd.). In conclusion Mr. C. R. Heathcock spoke of the work of the former West Midlands J.E.A.

Deficit on Trams

THE annual accounts of the Liverpool Corporation Passenger Transport Committee for the year to 31st March last show that the deficit on the trams has increased from £270,439 to £399,428, and the surplus on buses has advanced from £103,381 to £125,524. There was a net deficit of £248,938. The loss on trams is about 4d per mile and the profit on buses about 2d per mile. The difficulties have been aggravated by the steadily advancing wages and costs of materials, the tendency for traffic income to drop and the operation of so many pre-war and obsolescent types of trams.

Views on the News

By REFLECTOR

HOPE of equilibrium in electric power supply and demand has continually been deferred and still the position is uncertain. The latest prophecy I have seen is that by Mr. W. S. Burge, Controller of the East Midlands Division of the B.E.A. He told the East Midlands Electricity Consultative Committee recently that not until 1955 would there be a small surplus of plant. Mr. Burge complained of the intolerable delays imposed upon the provision of new plant by formalities and also of the cuts made in the B.E.A. estimates of requirements. The Government has not yet, apparently, come to a realization of the fact that every industry is dependent upon electricity and for that reason any curtailment of the electrical plant programme is extremely harmful to the whole of our national economy.

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Last week Mr. B. Traill Thompson severely criticized in the *Daily Telegraph* the form of hire agreement employed by the London Electricity Board. This contains clauses by which the Board divests itself of all responsibility for any accidents arising from defects in equipment or wiring whether the latter is provided by the Board or not. This naturally drew a reply from the Board's secretary, Mr. W. H. Warhurst, who claimed that such indemnity clauses were common to the agreements of London undertakings and that they were in accordance with ordinary commercial practice and not a product of nationalization. He pointed out that the number of accidents arising from the use of electricity in the home was extremely small anyhow. Mr. Warhurst concluded by assuring Mr. Traill that his letter would be carefully considered by the Board and its legal and technical advisers.

★ ★ ★

Mr. Thompson returned to the charge by denying that the indemnity clauses were ordinary commercial practice; they were normally found only in the contracts of constructional engineers and contractors or in the former contracts of railway companies and "others who could wield the big stick." If the number of accidents was so small, said Mr. Traill, why was an indemnity clause necessary? He pointed out that damage as well as injury was covered by the clause and he maintained that about 10 per cent of fires in this country were "believed to have an electrical cause." He thought the hirers should also have some say in the form of contract.

Whatever the legal position may be I think it very undesirable that electricity supply agreements should contain anything to suggest that the customer is always wrong or that in using electrical appliances he is laying himself open to trouble. Surely such cases as are visualized are very few and can be dealt with as they come.

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I mentioned two or three weeks ago the case of the Southport fountain. This is situated outside the electricity showrooms and was, apparently, acquired with the rest of the property by the Merseyside and North Wales Electricity Board. The Board offered it back to the Corporation (at a price) but the Corporation indignantly denied that it ever became the Board's property, having been a gift to the town from the former Electricity Committee. I now learn that the Board has graciously waived its claim to the fountain—a very wise decision in the circumstances.

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In order to get over its rather unwieldy name the Merseyside and North Wales Electricity Board is employing its initials as a sort of trade mark—"Manweb." This is certainly more convenient, but isn't there just a suggestion of the spider and the fly in it? Perhaps "Manwel" would be an improvement.

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Walking round Radiolympia I could not help feeling that it is a misguided policy to combine television and sound receivers in the same cabinet. It is impossible to use both sides at once and they should be separate so that members of the household can have a choice. I feel sure that sound and television sets ought not to be offered to the public as Siamese twins.

Cable Research

Sectionalized West London Laboratories

A STAFF of over a hundred is engaged at the Wood Lane investigational and development premises of British Insulated Callender's Cables, Ltd. The buildings cover 85,000 sq ft and are organized in eight major divisions.

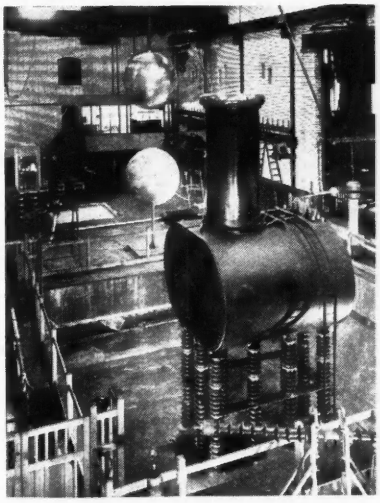
Laboratories Nos. 1 and 2 are concerned with tests on cables and ancillary apparatus. Two 500 kV, 500 kVA transformers, one mounted on porcelain insulators, can be cascaded to give 1,000 kV. Each occupies a central position in its own laboratory with two working spaces, enabling preparation work to be done in one area while testing proceeds in the other. In a corridor are switchgear and 3 kV single-phase motor-alternators for energizing the transformers. The control room, which overlooks the whole width of the two laboratories, provides for complete remote control of the test apparatus and houses the l.v. components of the Schering bridge (used for measurement of dielectric loss). There is also a Kelvin double bridge for the measurement of conductor temperature (by resistance method) and an automatic thermo-exchange for recording sheath temperatures.

An outlet from the laboratory enables experimental overhead lines erected in the grounds to be energized by the transformer. The corona loss on this overhead line and the dielectric loss of buried cables can be measured by a modified form of Schering bridge enclosed in a portable Faraday cage insulated from earth.

In a section of laboratory No. 2 is a temporary 500 kV surge generator having a discharge capacitance of 0.028 μF. A permanent 2,000 kV generator of four times that discharge capacity will soon be installed. A high-speed, continuously evacuated, cathode-ray oscillograph in conjunction with a capacitance potential divider will be used for voltage measurement.

Laboratory No. 3 is for stability testing long lengths of buried 66 kV and 132 kV cable at up to twice working voltage with superimposed heat cycles. These tests may last as long as 30,000 hours. There are a Schering bridge and a Kelvin double bridge for routine measurements during tests.

The proposed increase of the British grid voltage from 132 kV to 275 kV has necessitated a new design of overhead line conductor. In the U.S.A. the use of a hollow segmental conductor of increased diameter has reduced corona loss at high voltages. As an alternative, the I-beam shaped copper conductor has also found favour. On the Continent conductor arrays, or "Bundeleitungen," consisting of two, three or even four, conductors have remarkably lowered corona loss.



One of the high-voltage laboratories showing a 500 kV transformer in foreground

The Wood Lane laboratories have developed a similar type by providing the conventional solid-type s.c.a. conductor with a stress-reducing shroud in the form of a simple copper wire helix of 2in to 3in diameter and 1in pitch. Loss measurements compare very favourably with the best of the American and Continental designs.

In the power cable laboratories attention is given to the development of alternative materials for and methods of making cables for higher surge breakdown values. An impregnated pressure cable for 220 kV has been supplied to France and a further test length will be subjected to tests of twenty 1,080 kV impulses; surges at increasing voltages will then be applied until breakdown occurs.

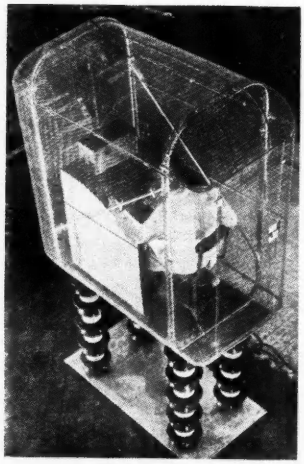
A 220 kV sealing end with semi-conducting glaze is to be seen on test in the grounds. There is also a 132 kV experimental sealing end with both internal and external stabilizing glaze, which is much more compact than the conventional type.

Among processes developed in the jointing laboratory is the "oxygen sandwich"

method of determining the position of a gas leakage from an i.p. cable. Trials are being carried out on i.p. cable joints with steel sleeves and novel arrangements for obtaining pressure tight connections on cable sheaths which are expected to be more economical than existing types.

Corrosion beds of soil with acidic, alkaline and organic content are used for investigating the efficacy of cable protective coverings.

The metallurgical laboratories investigate lead and lead-alloy sheathing. A Haigh fatigue testing machine has recently been installed and a machine has also been developed for testing sheathing under combined internal pressure and continuous vibration. There is a lead sheathing press for the study of extrusion and work is also carried out on aluminium as a cable sheathing material.



Operator at Schering bridge inside protective Faraday cage at high voltage

In the chemistry laboratories much use is made of the infra-red spectrograph for fundamental work on dielectrics; it is often the only means of detecting changes in the structure of hydro - carbon insulating compounds. Research is in progress on the stability of paraffin and naphthene base oils under electric stress. This laboratory is equipped for the determination of the molecular weight of plastics and other bodies and for measuring the degree of branching for these materials, an important factor in the performance of a material on the mill and in the extrusion operations.

In the rubber and thermoplastics laboratory, with the aid of small-scale factory equipment, silicone rubber flexible cables have been designed to withstand continuous operating temperatures of up to 150 deg C. A special study has been made of a process for vulcanizing natural and synthetic rubber at room temperature, which may subsequently permit the use of vulcanized in place of unvulcanized rubber in existing cable servings, thereby overcoming the difficulties of normal steam curing.

Materials used for the helical colour coding of p.v.c. do not readily adhere to polythene. Certain inks have been found, however, which give moderately good results.

Work on the new P.T.F.E. plastic material for covering wire, which is suitable as a radio frequency dielectric and able to withstand 200 deg C, is carried out with the active co-operation of the Ministry of Supply. There is also a miniature co-axial cable which consists of an enamelled wire with a thin metallic sheath.

The dielectrics section contains a miniature processing plant for the production of miniature cables, or condensers, for laboratory scale experiments with a great saving in cost. The function of another section is to develop special purpose electronic and other instruments for use in the company's laboratories and factories.

The welding laboratory aims at the improvement of resistance welding apparatus, welded sheath cables and their accessories. A method of obtaining an air-tight seam weld in aluminium by interposing a thin steel tape between each electrode and the work piece, has been patented.

The tube forming machine, designed and manufactured in the laboratories, shapes up to 2in diameter metal in a U-section in the first four heads; the cable is then fed in and the sheath completed by the next four heads. The sheath is formed with radial fins, which are seam welded together by the steel sandwich method, the fin being then turned over on to the cable.

Attention has been given to forming the outer conductor of co-axial cable by pulling a flat tinned copper strip through a suitable cold die and forming it into a homogeneous mass in a heated die. There is a new process of metallizing of specially designed porcelain, which is plumbed direct to the lead sheath and copper conductor to form a low-voltage sealing end. The inside of the porcelain is shaped to fit closely over the dielectric and no compound filling is thought to be necessary.

The fuse laboratory is developing high-discrimination fuse-links. The high pressures involved have caused investigation of reinforced ceramic barrels having multiple bores (in which the separate fuse elements are inserted) and bi-metal elements have enabled accurate fusing characteristics to be obtained on overload.

Small switchgear and the development of a new differential-current, earth-leakage, circuit-breaker have received attention in the laboratories.

Personal and Social

NEWS OF MEN AND WOMEN OF THE INDUSTRY

AN electro-plated tea service has been presented to **Mr. F. A. Martin,** secretary of No 1 (Bradford) Sub-Area, Yorkshire Electricity Board, by Mr. T. H. Carr, Sub-Area manager, on behalf of all departments, on Mr. Martin's retirement after fifty years with the electricity supply industry in Bradford.

Sir Richard Pease, Bt., has resigned from the board of the Brush Electrical Engineering Co., Ltd., and three members of the staff of the company have been appointed directors. They are **Mr. P. C. Sharp,** secretary of the company, **Mr. A. H. Syme,** comptroller, and **Mr. D. S. A. E. Jessop,** director of personnel.

Sir Richard Pease has been appointed an additional director of Heenan and Froude, Ltd.

Mr. L. H. Halling, at present on the south-eastern area sales staff of High Duty Alloys, Ltd., has been appointed sales area manager for Scotland, Northern Ireland and the three counties of Cumberland, Durham and Northumberland. He will be based initially at the company's factory at Winscales, Workington, Cumberland.

Mr. J. B. Scott, D.F.C. and Bar, Associate I.E.E., sales manager, Plant Division, Crompton Parkinson, Ltd., has been appointed to the board of executive directors for a period of one year beginning 1st October. Mr. Scott joined Crompton Parkinson, Ltd., in 1939, having previously been London manager of the Midland Electric Manufacturing Co. Ltd., and he was with the Plant Division in London and Manchester until 1942 when he joined the R.A.F. On demobilization in 1946 he returned to Crompton Parkinson as Manchester branch manager. In 1947 he became London branch manager, and in 1948 was appointed to his present position.

Mr. J. B. Scott

Mr. L. W. York, who has for many years represented Ekco-Ensign Electric, Ltd., in the Midlands, has now been appointed sales director of Electrical Engineering Supplies (B'ham), Ltd., 92, Cheapside, Birmingham, 12.

Miss Joan Whitgift has been appointed chief demonstrator and housecraft adviser to the Tube Investments subsidiary, Simplex Electric Co., Ltd., with effect from 1st October. Miss Whitgift has been associated with the electrical industry for over twenty years. She started with the Brompton & Kensington Electricity Supply Co., staying with them when the company became part of Central London Electricity Ltd., and after nationalization served with the London Electricity Board. In 1946, as first holder of the Caroline Haslett Travelling Exhibition, she made a tour of the United States studying domestic electrical equipment and the education of home economists. She is well known as a lecturer and teacher of adult students of domestic economy and as a writer on matters connected with home economics. For the time being, Miss Whitgift will be at the London branch of the Simplex Electric Co., Ltd., at 217, Tottenham Court Road, London, W.1.

Miss Joan Whitgift

Mr. F. S. Bowles, late of the Midlands Electricity Board and Wolverhampton Corporation, is now general manager of the Electrical Engineering Section of F. Westerman (Wholesale), Ltd., and a new appointment is **Mr. W. Webster,** who has joined the company as sales manager of the Electrical Engineering Section. Mr. Webster was with Holland House Electrical Co., Ltd., of Scotland, for fourteen years, as Aberdeen branch manager.

Mr. G. D. Coe, Hereford District manager of the Midlands Electricity Board has retired after twenty-two years' service with the Hereford electricity undertaking. Mr. Coe went to Hereford in 1927 as chief electrical engineer to the Corporation, having previously been borough electrical engineer at

Wrexham for seven years. On his retirement, certain adjustments are being made in the administrative areas. **Mr. J. R. E. Daft** will take charge of the Hereford District, which will include Ledbury rural district and Ross, and **Mr. W. J. Woodward,** now of Kington, will superintend the Leominster District, which will include Kington and Bromyard.

Mr. R. N. Buttrey, M.Sc., M.I.E.E., has resigned from the position of chief engineer with Cooke & Ferguson, Ltd., to take up the appointment of deputy chief engineer with Hoover, Ltd. Mr. Buttrey was a junior research engineer with Ferguson, Pailin, Ltd., from 1935 to 1940, when he specialized in circuit-breaker design and development. For the next three years he was assistant lecturer in electrical engineering at the College of Technology and the University of Manchester. He joined Cooke & Ferguson, Ltd., as consultant, in 1943, later becoming chief research engineer and finally chief engineer. As we reported in our last issue, **Mr. W. A. McNeill** has succeeded Mr. Buttrey as chief engineer of Cooke & Ferguson, Ltd.

Mr. R. N. Buttrey

Lady Railing, a member of the E.A.W. Council, has been re-elected chairman of the Women's Committee of the Housing Centre, and **Miss V. Norvick,** E.A.W. assistant secretary, has been re-elected a vice-chairman.

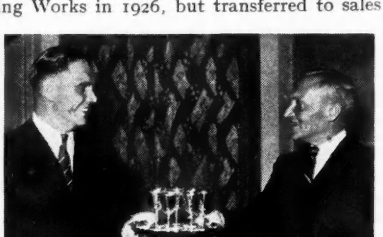
Mr. E. C. McKinnon, M.I.E.E., who has been chief engineer of the Chloride Electrical Storage Co., Ltd., for forty-five years, relinquished the post on 1st October, and has been succeeded by **Mr. C. P. Lockton,** M.Sc. Tech., A.M.I.E.E., who has been Mr. McKinnon's assistant and deputy for the last twenty-five years. Mr. McKinnon's services will continue to be available to the company in a consultative capacity. Mr. Lockton was educated at Berkhamsted School, Herts, and proceeded in 1920 to Manchester University where he studied electrical engineering at the College of Technology under Professor Miles Walker. After taking his degree in 1923 he was appointed as assistant designer to the British Electric Plant Co., Ltd., of Alloa, Scotland. He joined the Chloride Co. as an assistant engineer in September, 1924.

Mr. C. P. Lockton

Mr. W. J. Bird, who has been assistant manager of the Midland area of the General Electric Co., Ltd., since 1942, has left Birmingham and has taken up an appointment in London as an assistant to the company's sales director, Mr. T. W. Heather. His place at Birmingham has been taken by **Mr. R. H. Phillips,** formerly manager of the Leicester branch. **Mr. J. B. Taylor,** hitherto manager of the Exterior Lighting Department at Birmingham, has been appointed manager, Leicester branch.

On leaving Birmingham, Mr. Bird relinquishes the offices of senior vice-president, Birmingham Electric Club; assistant hon. secretary, I.E.E., South Midland Centre; and joint hon. secretary, Midland Electrical Engineers' Association. He joined the G.E.C. as a student apprentice at Witton Engineering Works in 1925.

Mr. Phillips has been manager of the G.E.C. Leicester branch since 1946. He joined the company at the Witton Engineering Works in 1926, but transferred to sales duties at Birmingham in 1929, serving in the Fittings and Cable & Switchgear Departments up to his appointment as manager of the Installation Materials Department in 1939. He received a T.A. commission in that year and served in the Royal Artillery throughout the war.



Mr. N. M. Hill, district manager, Midland area, G.E.C., making a presentation to Mr. W. J. Bird (left) on the occasion of Mr. Bird's leaving to take up an appointment in London

Mr. Taylor joined the G.E.C. Exterior Lighting Department in Birmingham in 1936. During the war he commanded a R.A. Regiment and since rejoining the G.E.C. staff at the end of the war he has commanded the 594th Regiment, R.A., T.A., in the Birmingham area.

On 24th September the **Igranic Electric Co., Ltd.,** held an "Open Day," when

4,250 friends and relatives of the company's 1,300 employees took advantage of the open invitation. The visitors included representatives from most of the other works in the town and nine schools sent parties totalling 330 scholars. Every visitor was presented with a souvenir programme, which showed pictorially the development of the works since 1904, with a brief outline of the company's history, its products and its welfare services. At different points along the route through the works special exhibits were to be seen and a great number of machines and manufacturing processes were specially demonstrated.

Obituary

Mr. A. E. V. Davies.—The death is reported in the *South African Electrical Review* of Mr. A. E. Val Davies, M.I.E.E., who, as a consultant, was responsible for introducing steam-driven generating plant in many towns in South Africa and the Rhodesias. He was educated at Glasgow Royal Technical College and served his apprenticeship with Mavor & Coulson and Wm. Beardmore.

Mr. T. W. Morgan, M.B.E., works manager of Marconi's Wireless Telegraph Co., Ltd., died at Chelmsford Hospital on 2nd October at the age of fifty-three. Mr. Morgan was born at Deptford, and joined the Radio Communication Co. in March, 1922, at that company's works at Barnes, Surrey. He transferred to the Marconi Marine Co. in 1928 and was appointed works superintendent at Barnes in January, 1932. In 1935 he transferred to Marconi's Wireless Telegraph Co., Ltd., at their works at Chelmsford in the position of shop superintendent; he was appointed works superintendent later in the year and works manager in 1940.

Mr. G. Falk.—The death occurred on 1st October, in a hospital at Margate, of Mr. Gustav Falk, a director of Falk, Stadelmann & Co., Ltd. Mr. Falk joined the company in 1902 and in 1910 went to manage the Glasgow branch. He returned to London in 1914 and became a departmental manager. When the business was converted into a public company in 1928, Mr. Falk became a director, and in 1942 was appointed joint managing director. He succeeded the late Mr. Max Falk as chairman of the company in 1945. In November, 1947, owing to ill-health, he resigned the chairmanship but remained a member of the board.

Sir Herbert Walker, K.C.B., who was general manager of the Southern Railway from 1923 to 1937, died on 29th September at the age of eighty-one. Under his guidance the Southern Railway suburban system became the largest suburban electrified service in the world. He was responsible for the new Waterloo Station, and the modernization of many other stations on the Southern Railway system, and for the construction of the vast new docks at Southampton. When he retired from the position of general manager he joined the Southern Railway board, from which he retired last year on the nationalization of the railway.

Mr. William McGeoch, A.M.I.E.E., deputy chairman of William McGeoch & Co., Ltd., whose death we briefly reported in our last issue, entered the company in 1886. The concern was founded by his grandfather in 1832, and has been controlled by the family during the whole of its existence. Mr. McGeoch was appointed a director in 1900 and became works managing director about twenty years later, subsequently becoming deputy chairman. He had been in semi-retirement for the past twelve years. Mr. McGeoch was a member of the Institute of Metals, and of the Institute of Plastics and was associated with a number of patents relating to electrical fittings. He was president of the Brassfounders' Employers' Association (now the National Brassfoundry Association) in 1930. The funeral took place on 26th September, at Knowle Parish Church, and was attended by representatives of the staff and employees of the company.

The late Mr. W. McGeoch

Wills

Mr. E. R. Grote, A.M.I.E.E., managing director of British Electric Lamps, Ltd., Wimbledon, who died on 7th March last, left £95,946 gross (£93,428 net).

Mr. P. Newton, A.M.Inst.C.E., retired electrical engineer for the L.M.S., who died on 1st May last, left £25,171 gross (£24,004 net).

Major D. V. Fleming, formerly a director of Hipprum Wires, Ltd., who died on 8th July, left £1,572 gross (net value nil).

Mr. L. E. W. Johnson, a director and secretary of Colchester Central Electrical Co., who died on 27th April last, left £14,254 gross, (£14,193 net).

Mr. M. B. Hunter, O.B.E., A.M.I. Mech.E., of Marconi's Wireless Telegraph Co., Ltd., who died in 9th July last, left £14,893 gross (£14,633 net).

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Managerial Grades

YOUR leading article under the above heading is of very great interest to those municipal engineers who "disappeared as such" and others in equivalent positions. Many of these men, who had done very much to bring the industry to the high regard in which it was held at 31st March, 1948, employed managers in various departments and themselves held positions comparable with that of general manager in other walks of life. No-one can imagine that the "magic" of nationalization has so affected their undertakings that the functions they now exercise are not those of management but something less and that it would, therefore, be logical for the E.P.E.A. to claim them as members.

In a later paragraph you explain that membership of "the higher circles" in Nalgo "makes it difficult for those grades to be dealt with by the Joint Councils, and seems to necessitate a separate arrangement." The difficulty referred to here is, of course that of the relative positions of the representatives to the Joint Councils, some representing employers, although in the broadest sense all are employees, others representing employees. This relationship existed between municipal electrical engineers and their staff before nationalization and is still unaltered (with very few exceptions). This employer-employee relationship constitutes a very valid reason why they should not all be members of the same trade union.

The "separate arrangement" which you suggest is necessary, as a solution to the Nalgo members' difficulties, would obviously have to be a separate association, and this conclusion is equally obvious in the case of the electrical engineers and managers. Whether the "nebulous organization" to which you refer is a suitable one for this purpose, whether it could be adapted to include "members in the higher circles" now in Nalgo, and where the dividing line must be drawn are obviously matters for further discussion.

The present position of many of those in the grades which appear to be the bone of contention between the rival associations is somewhat anomalous, as those who will be appointed to represent their interests on the Joint Board will be elected by one of these bodies. One of these, as has been shown, is unsuitable, the other is rightly described as "nebulous" and from the very little information available unlikely to attract the membership of those it seeks to represent.

The solution would appear to be the formation of a new association untrammelled by former allegiances and comprising those whose positions and salaries are higher than those catered for by the E.P.E.A. The line of demarcation should be fixed at the position of District Managers, these being representatives of the employer at the head of each district organization. Grades equivalent and above this level in managerial responsibility could be included as far up the scale as mutual interest is found to extend.

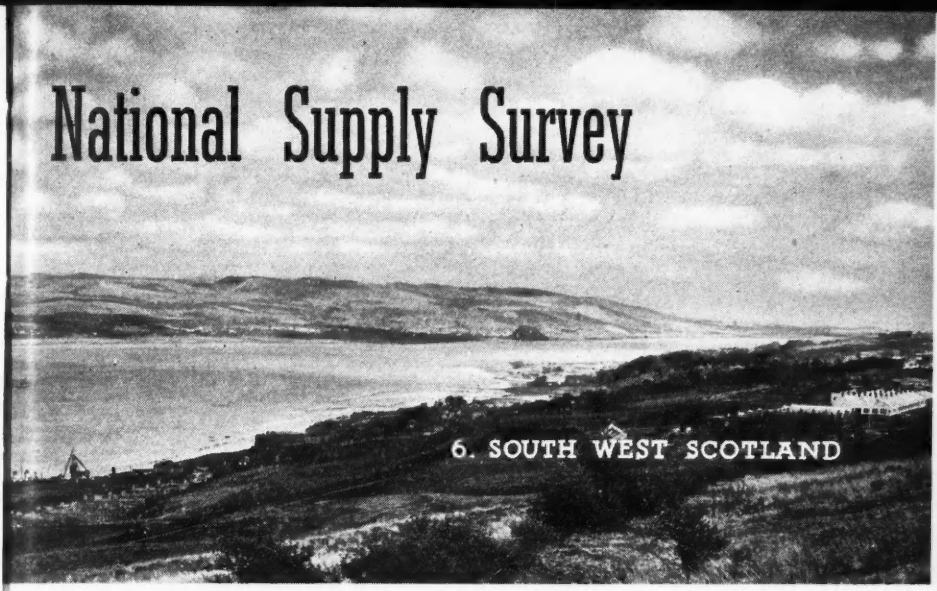
It is difficult to understand why the E.P.E.A. should fear that the A.M.E.E. or any other association at this level would poach on its preserves. It looks rather like the poacher assuming the status of the gamekeeper. Do the rank and file of its members support the views of the executive? And do they visualize their own positions when they cross the line of demarcation as many of them will?

"BONE."

Electricity and Cleaner Air

COMMENTING on the abatement of atmospheric pollution caused by smoke, the Liverpool Medical Officer of Health, in his annual report, states that of a total of 194,075 houses in the city, approximately 40,000 are using electricity for cooking, whilst many others employ this form of power for heating.

National Supply Survey



ELECTRICAL ASSESSMENT OF THE AREA

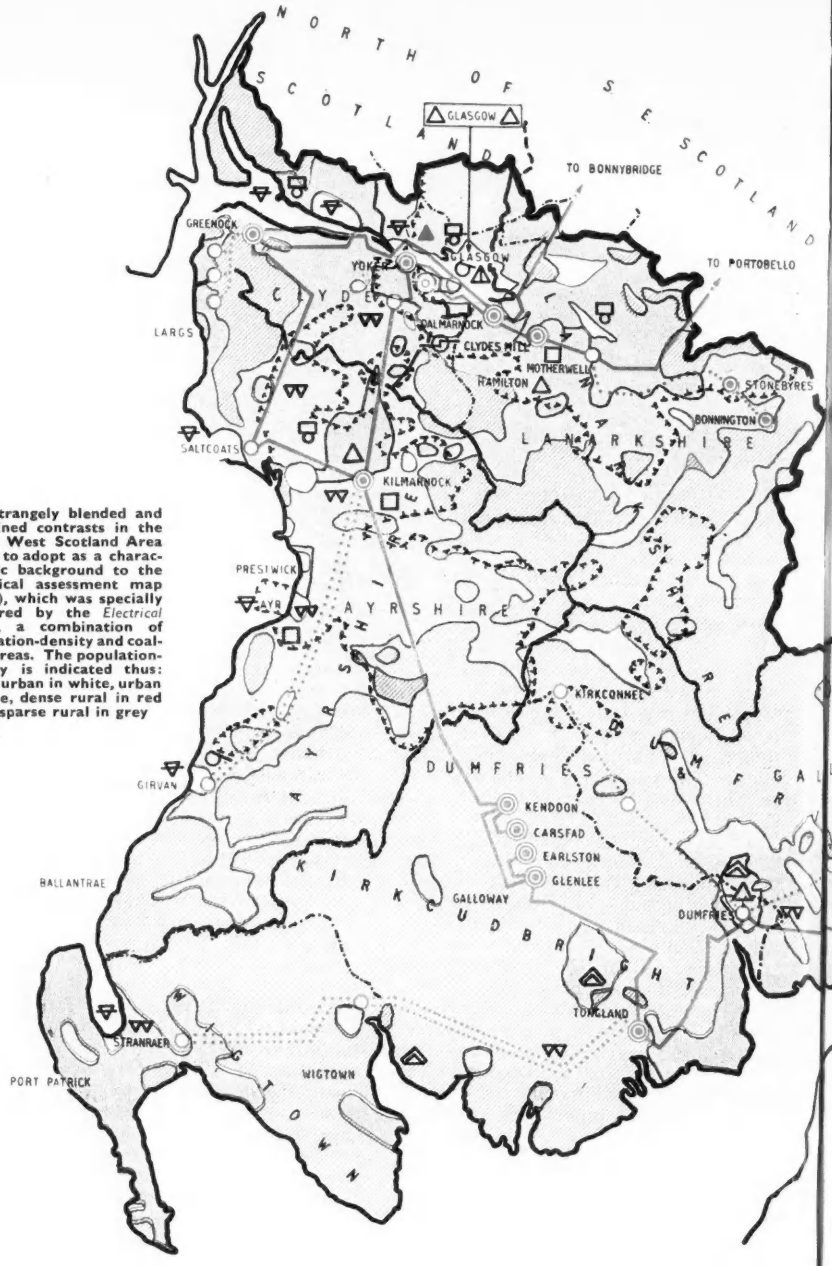
THE South West Scotland Area which covers 5,000 sq miles and is the fifth largest of the fourteen Areas, probably provides as great a number of contrasts as does any of the others. It is roughly triangular, with one side from a point north of Whistlefield to the Mull of Galloway, and a second side from the Mull along the Border to near Charter Fell.

In the west the boundary follows parts of the Dumfriesshire, Lanarkshire, Stirlingshire and Dunbartonshire borders. The Area includes the counties of Ayr, Renfrew, Lanark, Dumfries, Kirkcudbright, Wigtown, the County of the City of Glasgow and parts of Roxburghshire, Stirlingshire and Dunbartonshire.

The population is about 2.5 millions, and by far the greater portion is concentrated in the great industrial areas of the Clyde, Glasgow and Lanarkshire. The distribution of the population in this area does, in fact, provide the first of our contrasts. In Glasgow and the surrounding district the population density is over 25,000 per sq mile. The Ordnance Survey "population density" map shows a shading off to 400 persons per sq mile in the east, while to the west and south west the hilly land is described as "sparse rural" or "virtually uninhabited." This means that the South West Scotland Electricity Board has to serve vast industrial concerns, densely populated urban districts and widely scattered countryside.

The Clyde itself provides a series of contrasts between its splendid estuary bordered by mountain scenery, and with a holiday atmosphere accentuated by the pleasure steamers, many proudly bearing the battle scars received in two wars, and the sterner world of the docks and industry. At Hillington in this area is one of the largest trading estates in Great Britain, and its tremendous contribution to the war effort made it the subject of several articles in the *Electrical Review* during the war. Glasgow, always an extremely busy centre, probably surpassed any other port in wartime activity, but now its efforts are directed to furthering the export drive, and ships for and from

As our title picture shows, the splendid estuary of the Clyde, with its pleasure steamers, contrasts strongly with the sterner world of docks and industry at Glasgow



The strangely blended and combined contrasts in the South West Scotland Area led us to adopt as a characteristic background to the electrical assessment map (right), which was specially prepared by the *Electrical Review*, a combination of population-density and coal-field areas. The population-density is indicated thus: dense urban in white, urban in blue, dense rural in red and sparse rural in grey

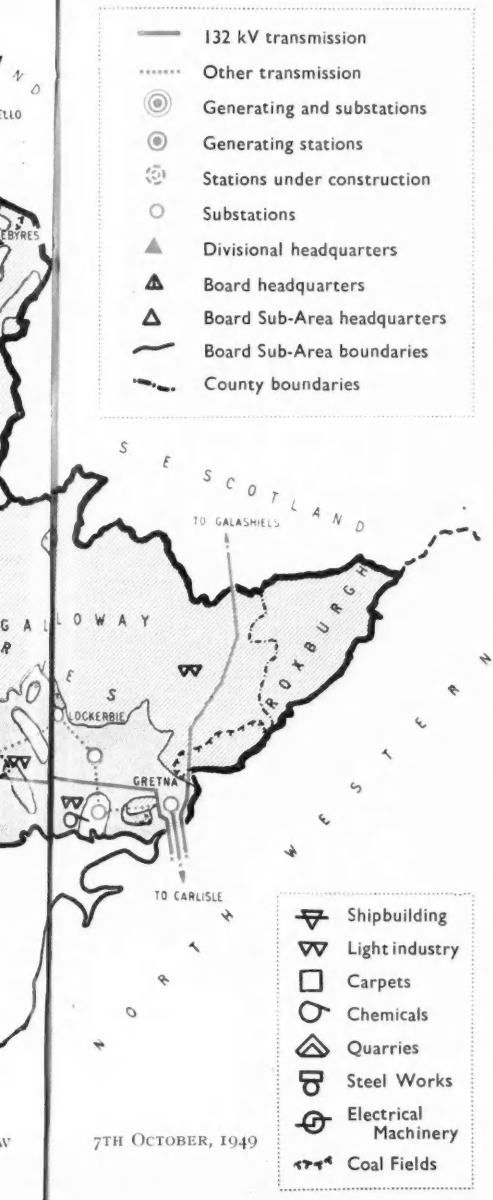
all parts of the world meet in the docks. The Clyde Navigation Trust is striving more and more to increase the great scope of this work.

The land to the west and east of Glasgow is very rich in coal, some of which is used in the vast smelting furnaces in the Glasgow and Motherwell districts. The coal field to the west of Glasgow, however, lies under land excellent for farming, so that we find here two ways of life unusually combined. This strange mixture of heavy industrial and rural life is peculiar to our coal mining areas which are the only parts where cow byres are found adjacent to heavy industrial undertakings.

The Ayrshire cattle are renowned and many are being "exported" to England and Wales to help improve the depleted stocks in the south. The slopes of the coastal areas of Ayrshire are used mainly for growing the famous Scottish early potatoes, but there is a considerable amount of market gardening too. Further inland dairy farming is the major activity, although some land is ploughed, but on the hills of South Lanarkshire and Dumfries sheep farming is about all that goes on. To the south of Wigtown, and along the coast the land is used mainly for dairy farming, though there is also some arable farming. Near the coast the land lies low, but it soon rises in gentle slopes for dairy farming, and so to the barer hills of the celebrated Lowlands of Scotland where live only the shepherds with their sheep.

The lower slopes of these hills are still forested in places, as for example, near Dumfries and Kirkcudbright and behind Ayr, and the visitor will notice that the majority of the trees are coniferous, as in the woods of Glanalip Castle, which fine building reminds us of the traditions of the Scottish laird. The castle is near Ballantrae, the scene of R. L. Stevenson's novel, about 30 miles south of Alloway (Ayr) which was the birthplace of Robert Burns and where still each year the banks and braes o' Bonny Doon bloom sae fresh and fair.

In contrast to the undeveloped Doon is the river Ayr, a few miles to the north, on the upper reaches of which, at Catrine, is a textile works which, until recently, used the largest water wheel in this country. These works are now being reconstructed under a Government-sponsored scheme which will result, it is claimed, in the largest works of its kind in the world, so that with Glasgow and



other places in the area Catrine is playing a vital part in the export trade.

Only five miles to the south-east of this monument to modern industrial advance is Auchinleck, and from the grounds of the old castle here Boswell cut some of the wood from the broom bushes to send to Dr. Johnson with the suggestion that he should "get it formed in boards for a treatise of witchcraft by way of a suitable binding." And further south in the peaceful village of Gretna Green the renowned smithy to-day appears quite innocent. In South West Scotland, indeed, old and new, legend and science, industry and agriculture are strangely blended and combined to form a variegated background to an important part of the nationalized electricity supply industry, and to lead us to adopt as a characteristic background for our special map a combination of population density and the coal fields.

What is the electrical assessment to which all the foregoing is such a rich background? First, let us show how the load is distributed in accord with the population and industrial distribution to which we have referred, and will now enlarge upon from the more direct electrical aspects. A convenient way to refer to the population distribution is in terms of the five Sub-Areas, and the following figures relating to each Sub-Area are its area in sq miles and its population, respectively: Glasgow, 27 and 928,000 Lanarkshire, 908, and 655,000; Clyde, 373 and 549,000; Ayrshire, 1,100 and 321,000; Dumfries and Galloway, 2,592 and 151,000.

It must be appreciated, however, that comparisons between the population densities thus depicted can be very misleading without bearing in mind the character of each Sub-Area. For instance, whereas the density figure of 33,000 per sq mile for the Glasgow Sub-Area is fairly well represented over the whole Area, the density figure of 60 persons per sq mile for the Dumfries and Gallo-

As we travel inland the land rises in gentle slopes to the celebrated lowlands of Scotland where lives only the shepherd and his sheep; Dumfries in foreground *(Aerofilms Photo)*

Glanalip Castle near Ballantrae, reminiscent of R. L. Stevenson's novel

way Sub-Area embraces such wide local population densities as "dense urban" (over 25,000 per sq mile) for a part of Stranraer, "urban" (from 6,400 to 25,000 per sq mile) for a part of Dumfries town, "industrialized rural" (400 to 6,400 per sq mile) for New Galloway and "dense rural," "sparse rural" and "virtually uninhabited" for quite sizeable areas.

The most direct electrical representation of population and population density is by way of consumers. There are about 659,000 consumers in the South West Scotland Area, and the corresponding figures to the nearest thousand for the Sub-Areas are as follows: Glasgow 251,000, Lanarkshire 157,000, Clyde 143,000, Ayrshire 74,000 and Dumfries and Galloway 33,000. These consumers are of many types—domestic, commercial, agricultural, industrial and public lighting, to name only a few of the broadest headings, and the industrial consumers include, *inter alia*, iron and steel works, engineering works, collieries, shipyards, rubber-tyre factories, textile mills, brickworks, cement works, quarries, electric-lamp makers, paper mills, chemical works, rope works, potteries, saw mills, oil refineries, soap factories, paint works, distilleries, furniture factories, tanneries and printing works.

(Aerofilms)

The renowned smithy in the Border village of Gretna Green

Some of the larger industrial consumers with their m.d. and consumption figures for 1947 are: a chemical works at Mossend, 11,070 kW and 64.7 million kWh; a boiler works at Renfrew, 7,249 kW and 23.3 million kWh; a rubber

works at Inchinnan, 3,900 kW and 17.9 million kWh; a steel works at Wishaw, 6,800 kW and 23.9 million kWh; a shipyard at Clydebank, 5,064 kW and 14.7 million kWh; a steel works at Clydebridge, 3,500 kW and 10.3 million kWh; a steelworks at Gartgosh, 2,150 kW and 11.4 million kWh; a tube works at Coatbridge, 2,100 kW and 9.1 million kWh;

(*Aerofilms*)

Looking west from Wigtown Bay we see the low-lying fields excellent for dairy and arable farming

a steelworks at Motherwell, 8,020 kW and 19.8 million kWh; an explosives factory at Stewarton, 4,768 kW and 26.2 million kWh; a chemical works at Glasgow, 3,950 kW and 25.8 million kWh; a Glasgow steel works, 9,540 kW and 24.4 million kWh; a shipyard at Glasgow, 4,464 kW and 9.3 million kWh; and a tea chest works at Glasgow, 1,980 kW and 9.3 million kWh.

The closest concern of most consumers is probably their tariffs, and to give an overall picture of the tariff position at the beginning of the new era of electricity supply we quote some selected examples of the tariffs which were in force up to the Vesting Day:—

Glasgow, Rutherglen, the first 40 kWh for the first apartment and 20 kWh for each additional apartment per annum 3d per kWh, nine times the above quota 0.6d per kWh, and all in excess 0.4d per kWh; Paisley, 40s per annum for the first two apartments and 15s per annum for each additional apartment, plus 0.6d per kWh; Greenock, for two apartments 9d per week, three apartments 1s per week and four apartments 1s 4d per week, plus 0.5d per kWh; Skelmorlie, £1 per annum for each normal room plus 1d per kWh; Dumbarton, 2s 3d per room for each summer quarter, 5s per room for each winter quarter, plus 0.75d per kWh; Ayrshire, 5 kWh per annum for each £1 of assessed annual rental, plus 100 kWh per annum at 4d, nine times the above quota at 0.8d per kWh, and all in excess at 0.7d per kWh; Dumfries Burgh, first 750 sq ft at £2 10s per annum, 1,000 sq ft at 0.75d per sq ft per annum, plus 0.625d per kWh; Wigtownshire, 1,000 sq ft at 1.25d per sq ft per annum, 1,000 sq ft at 1d per sq ft per annum, plus 0.75d per kWh.

Closely allied with tariffs in the consumer's mind is the service he receives, and a good indication of the facilities

Robert Burns' cottage near the "banks and braes o' Bonny Doon"

available throughout the Area is given by naming the following showrooms and service centres which are presented for convenience under Sub-Area headings. *Glasgow*: Glasgow City; *Clyde*: Glasgow (Sub - Area H.Q.), Greenock, Paisley, Yoker and Barrhead; *Lanarkshire*: Hamilton, Motherwell and Lanark; *Ayrshire*: Girvan and Irvine; *Dumfries and Galloway*: Annan, Castle-Douglas, Dalbeattie, Dumfries, Langholm, Lockerbie, Stranraer, Thornhill and Moffatt.

For a very large Area we like the idea of a load analysis by location—crude, no doubt, from the purely statistical viewpoint, but in helping to characterize the Area it gives meaning to the supporting figures. First, then, let us show the kWh sold and consumption per head of population in Sub-Area groups for the year 1948/49: Glasgow, 784 million kWh (845 per head); Clyde and Lanark, 1,208 million kWh (1,003 per head); Ayrshire, 218 million kWh (679 per head); Dumfries and Galloway, 84 million kWh (556

The transatlantic liners "Queen Elizabeth" and "Queen Mary" were built in the world-famous shipyard of John Brown & Co. near Rothesay Dock at the mouth of the River Cart

LOAD ANALYSIS (CONSUMPTION BASIS) 1948/1949 (kWh in Thousands)

Sub-Areas and Board Area	Domestic	Per cent of Board area Domestic Sales	Agri-cultural	Per cent of Board area Agricul-tural sales	Com-mercial	Per cent of Board area Commer-cial sales	Indus-trial	Per cent of Board area Industrial sales	Public Lighting	Per cent of Board area P.L. Sales	Sub-Area Total	Per cent of Board area total sales
Glasgow	256,567	35.0	—	—	236,708	62.0	280,337	24.6	10,548	48.9	784,060	34.2
Per cent Sub-Area total sales ...	32.7	—	—	—	30.2	—	35.7	—	1.4	—	100	—
Clyde and Lanarkshire	358,347	48.9	3,907	19.9	103,357	27.1	3,526 } 729,808 }	64.5	8,625	39.9	1,207,680	52.6
Per cent Sub-Area total sales ...	29.7	—	0.3	—	8.6	—	60.7	—	0.7	—	100	—
Ayrshire	78,704	10.7	4,937	25.2	26,911	7.0	105,957	9.3	1,921	8.9	218,430	9.5
Per cent Sub-Area total sales ...	36.0	—	2.3	—	12.3	—	48.5	—	0.9	—	100	—
Dumfries and Galloway ...	39,879	5.4	10,760	54.9	14,073	3.9	18,188	1.6	512	2.3	84,362	3.7
Per cent Sub-Area total sales ...	47.3	—	12.8	—	17.8	—	21.6	—	0.5	—	100	—
Board Area	733,497	100	19,604	100	381,049	100	1,137,776	100	21,586	100	2,294,422	100
Per cent Board Area total sales...	32	—	0.8	—	16.7	—	49.6	—	0.9	—	100	—

per head); South West Scotland area, 2,294 million kWh (881 per head).

In the light of what has already been said about the densely populated and most industrialized parts of the Area and of the industrial figures in the following statistical analysis it will be sufficient to refer to the village-supply and the farm-supply positions to complete this rough analysis by location. In connection with the table on the opposite page relating to village supplies we draw attention to the fact that 10.8 per cent of the total consumers live in villages, and supply is available to 84.8 per cent of the total villages in the Area and to 96.5 per cent of the total village premises in the Area.

On 31st March, 1949, there were 4,181 farms connected in the Area. This figure represents roughly 44 per cent of the total number of farms and is made up as follows: Clyde Sub-Area 470, Lanark Sub-Area 1025, Ayrshire Sub-Area 962 and Dumfries and Galloway Sub-Area 1,724. The load analysis table herewith presents a very clear picture of the consumption position throughout the Area for the year 1948-49.

The foregoing electrical conditions were built up by the following undertakings before Vesting Day: Airdrie Corporation, Ayrshire Electricity Board, Clyde Valley Electrical Power Company, Coatbridge Corporation, Dumbarton Corporation, Dumfries Corporation, Dumfries County Council, Dunbarton County Council, Electric Supply Corporation, Ltd., Galloway Water Power Co., Glasgow Corporation, Greenock Corporation, Hamilton Corporation, Helensburgh Corporation, Kirkcudbright County Council, Lanark County Council, Lanarkshire Hydro-Electric Power Co., Motherwell and Wishaw Corporation, Paisley Corporation, Skelmorlie Electric Supply Co., Ltd., Strathclyde Electricity Supply Co., Ltd., and Wigtownshire Electricity Co., Ltd.

Associated with these undertakings were the following generating stations which are presented in schedule form on the opposite page for the convenient study of the generation position in the area.

One new generating station, Braehead (Glasgow), is now being constructed in the Area. It will have an ultimate capacity of 200 MW and it is likely to

be in commission early in 1951 with an initial capacity of 100 MW. Clyde's Mill extension is virtually a new station in that it is entirely separated from the existing plant. It is likely to be completed next year with a capacity of 60 MW.

A perusal of the special map published in the *Electrical Review* of 3rd June last will reveal that the South West Scotland Area comprises roughly the western half of the combined former Central and South Scotland Areas of the C.E.B., or the Glasgow grid control area. To make the definition more accurate we can say that the new South West Scotland and South East Scotland Areas combined correspond to the former Central and South Scotland Areas with the exception of a strip of land averaging about 12 miles wide and embracing Abernethy and Dundee, immediately north of the South East Scotland Area, which is now vested in the North of Scotland Hydro-Electric Board. This means that the present generating position in the two new South Scotland Areas is roughly that of the former grid control area less the generation at the Dundee power station and the sales to the Dundee undertaking, and less the contract purchases from the former Grampian Electricity Supply Co., Ltd.

In 1947 the electricity generated in the two former areas was 3,349 million kWh, and, regarding the purchase of 68 million kWh from the Grampian Company as area generation, the total generation figure for the combined Central and South areas was 3,417 million kWh. The kWh supplied to authorized

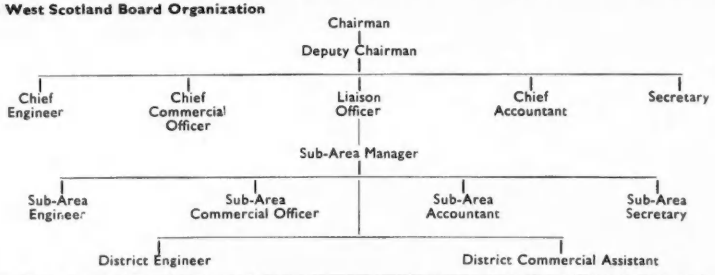
Sub-Area	Total Villages in Area		Villages on Supply			
	Villages	Premises	Villages	Premises	Consumers	Percentage consumers connected
Glasgow	—	—	—	—	—	—
Clyde	63	16,842	53	16,680	15,919	95.44
Lanark	144	23,980	103	22,305	19,134	85.78
Ayrshire	64	42,248	57	41,048	23,500	57.25
Dumfries and Galloway	197	11,157	184	10,873	9,724	89.43
Board Area	468	94,227	397	90,906	68,277	75.11

Station	Previous Owner	Type	Installed Capacity MW	Effective Capacity MW	Method of Operation
Clyde's Mill	Clyde Valley Elec. Power Co. ...	Steam	158.0	153	3-shift
Dalmarnock	Glasgow Corporation	Steam	237.5	230	3-shift
Fergusliе	United Thread Mills, Ltd.	Steam	17.75	13	1-shift
Dellingburn	Greenock Corporation	Steam	8.0	8	1-shift
Kilmarnock	Ayrshire Elec. Board	Steam	85.0	80	3-shift
Yoker	Clyde Valley E.P.C.	Steam	100.0	97	3-shift
Bonnington	Lanarkshire Hydro E.P.C.... ...	Hydro	9.8		3-shift
Stonebyres	Lanarkshire Hydro E.P.C.... ...	Hydro	5.7	9	3-shift
Carsfad	Galloway Water Power Co. ...	Hydro	12.0	12	Remote Controlled
Earlstoun	Galloway Water Power Co. ...	Hydro	12.0	12	Remote Controlled
Glenlee	Galloway Water Power Co. ...	Hydro	25.0	24	3-shift
Kendoon	Galloway Water Power Co. ...	Hydro	21.0	21	3-shift
Tongland	Galloway Water Power Co. ...	Hydro	33.25	33	3-shift

The Divisional H.Q. building is the former H.Q. of the old Central and South Scotland Areas of the Central Electricity Board

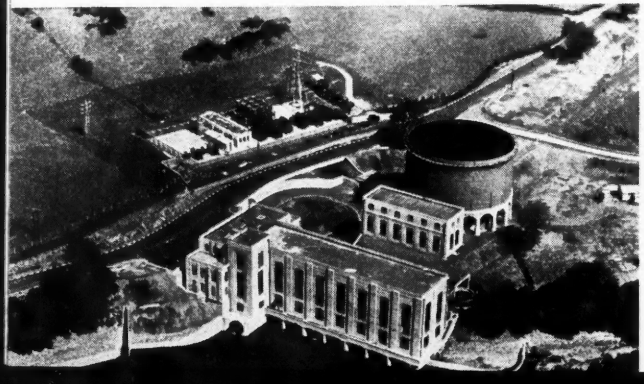
The South West Scotland Electricity Board executive team. Front row. Left to right: Messrs. W. Hutton and J. S. Pickles. Back row. Left to right: Messrs. C. W. Flint, J. Henderson, James Gogan, J. Meek and W. J. Cooper

South West Scotland Board Organization



undertakings was 3,189 million kWh. The electricity exported amounted to 169 million kWh and that imported to 141 million kWh, resulting in a net export of 28 million kWh. The simultaneous m.d. sent out on 20th January was 879 MW, which includes an export demand of 59 MW. The simultaneous undertaking m.d. was 811 MW on 30th January, with an export demand of 27 MW, and the simultaneous m.d. sent out at that time was 859 MW, which includes grid losses.

On the South West Scotland main (grid) transmission system there are the following transformer and switching stations (The installed capacities in kVA are shown in brackets):—Carsfad (15), Clyde's Mill (60), Dalmarnock (120), Dumfries (30),

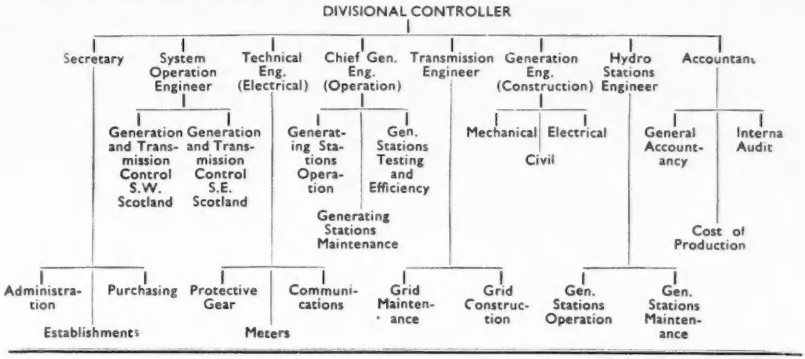


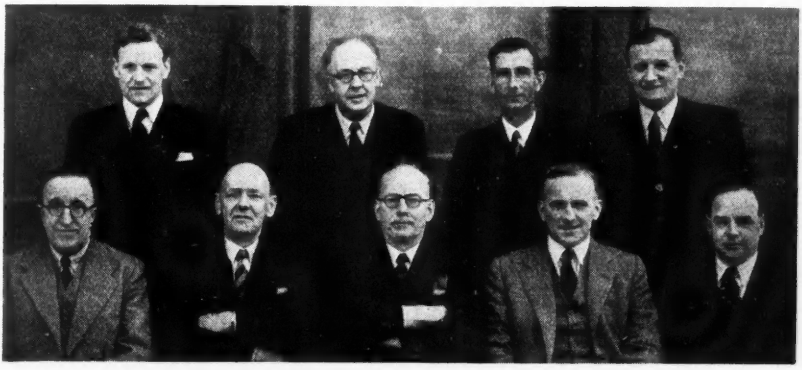
Tongland is one of the stations in the Galloway water power scheme

Earlstoun (15), Glenlee (30), Greenock (40), Kendoon (30), Kilmarnock (40), Motherwell (70), Paisley (60), Port Dundas (150), Saltcoats (30), Tongland (80), and Yoker (60).

Because the essential purpose of our survey is to present an electrical assessment of each area as near as possible to Vesting Day, we must not concern ourselves in this article too closely with the activities of the new organizations responsible for electricity supply in the Area. The main structures of these organizations, the South West Scotland Electricity Board and the South West Scotland Division of the British Electricity Authority, are shown in the form of organization "trees." In conjunction with these trees we are able to present also group photographs of the Board and Division "executive teams." In the case of the Board the executive team consists of Mr. J. S. Pickles, chairman; Mr. W. Hutton, Deputy Chairman; Mr. J. Henderson, Chief Engineer; Mr. J. Meek, Secretary; Mr. C. W. Flint, Chief Accountant; Mr. James Gogan, Chief Commercial Officer; and Mr. W. J. Cooper, Liaison Officer. The Board is not yet fortunate enough to have a permanent headquarters because of the extremely difficult accommodation position in the area, but for

South West Scotland Division Organization





The South West Scotland Division executive team. Front row, left to right, Mr. F. H. Williams, Mr. W. McFarlane, Mr. E. J. Edgar, Mr. A. C. Christianson and Mr. C. L. Walters. Back row, left to right, Mr. J. Stirrat, Mr. J. A. Aked, Mr. J. Croucher and Mr. J. F. Prickett

the present it exercises control from 62, Dalziel Drive, Glasgow, S.1.

The executive members of the South West Scotland Division are Mr. E. J. Edgar, Controller; Mr. W. McFarlane, Chief Generation Engineer (Operation); Mr. J. A. Aked, Transmission Engineer; Mr. C. L. Walters, Technical Engineer; Mr. J. A. Croucher, Generation Engineer (Construction); Mr. F. H. Williams, Hydro-Electric Engineer; Mr. J. Stirrat, System Operation Engineer; Mr. A. Christianson, Secretary; and Mr. J. F. Prickett, Accountant.

Mr. Edgar has for his headquarters the H.Q. of the former combined Central and South Scotland C.E.B. Areas, at 168, Broomhill Drive, Glasgow, W.1, in the grounds of which are the control room for the S.W. Scotland and S.E. Scotland Divisions, and some excellent outbuildings which have been erected since Vesting Day to accommodate the staff transferred from various electricity undertakings, so that the reorganization is now complete and operating smoothly from one centre.

There are two points in particular to which we may refer in connection with the future outlook. One is the encouragement given by Scottish Industrial Estates, Ltd., to the introduction of light industry into the area. The other is the new satellite town which is to be established at East Kilbride for a population of 50,000. The present population is 2,000.

At East Kilbride (old church shown) a satellite town will arise to accommodate 50,000 people

We are indebted to Mr. Pickles and Mr. Edgar and to some of their principal officers for co-operation in the investigation which has resulted in this contribution to our National Survey.

Voltage and Frequency Reductions

Methods of Avoiding Load Shedding

RESULTS of lowering frequency on the Pennsylvania-New Jersey and the Baltimore-Washington interconnections, are reported in *Electrical Engineering*, the official journal of the American I.E.E. The combined system load is approximately 5 million kW. A frequency reduction of 1 per cent gave an overall load reduction of 2.6 per cent, 1.9 per cent being due to synchronous and asynchronous plant and 0.7 per cent related to resistance load.

Procedure adopted is that, when the "spinning reserve" drops to zero and the frequency is falling, a voltage reduction of 7½ per cent is ordered. Should this prove inadequate, the frequency is allowed to drop by 1 per cent, beyond which load would be shed.

Tests are also reported in the Kansas City undertaking, which had a peak load of 235,000 kW when it was isolated from the rest of the interconnection system. At normal voltage a frequency reduction of 2½ per cent gave a load reduction of 4.68 per cent, or about 1.87 per cent load relief for 1 per cent drop in frequency. Lowering the voltage by 1 per cent reduced the load by 1 per cent. With voltage 3 per cent below normal, it was found that a 1 per cent reduction in frequency eased the load by 1.78 per cent.

By lowering the system primary voltage by 5 per cent and decreasing the frequency by 2½ per cent, a load reduction of 9 per cent was obtainable when automatic regulators in the substations were set for non-automatic operation. Otherwise, the drop in load owing to decreased voltage would be only from 0.3 to 0.6 per cent for each 1 per cent drop in voltage.

Industry and the House

The Missing Programme

BY F. J. ERROLL,
M.A., A.M.I.E.E., M.P.

NOT for many years has the House of Commons reassembled during a Parliamentary Recess for the purpose of a special debate. That the devaluation of the pound merited such a break with usual practice was clear within a few hours of the original announcement. The public may therefore seem disappointed that a debate which was extremely well-attended throughout by M.P.s of all parties should have apparently produced so little constructive matter. The Government could offer little in the way of a new programme. Instead it is to be "the mixture as before," with rather more severe doses.

The fact is that a Government with at the most only a few more months of life before a General Election cannot initiate a new programme. Like the manager who has only a few months to go before retiring from his firm, the Government is content to rest upon a continuation of existing policies rather than embark upon the hard task of initiating a new programme which it may not have the opportunity of fully deploying.

Political Issue Clarified

Even without the electioneering speeches of Mr. Churchill and Mr. Aneurin Bevan, the debate would have shown clearly that the House realizes that little more useful work can be done until an election has taken place. The debate was therefore essentially a political occasion, and practical men can look in vain for a detailed programme for the immediate future. Nevertheless, the occasion was valuable because it has clarified the political issue, although the danger is that the country may drift for several months —vital months—until a General Election will either confirm the present Government in office or place a new Government in power.

At no time was this clearer than in the opening speech of the Chancellor of the Exchequer. In a long review of the past he justified the programme of the present Government, and he explained the circumstances under which he had been compelled to devalue the pound. Nevertheless, the Government had been able to maintain full employment and at the same time to build up an export trade more rapidly than most people had expected.

The Chancellor urged all manufacturers and merchants to "improve our competitive position in the North American markets, and to introduce into those markets lines of goods which we had never sold there before." The change in the dollar value of sterling had opened up immense possibilities and everyone who could discover any way of selling more goods in the United States or Canada had a clear duty. The Chancellor detailed the opportunities and reminded manufacturers of what must be expected from them.

Blow to Enterprise

The House was quiet because it had heard it all before. Apart from exhortation the only definite action Sir Stafford Cripps is proposing is to increase the tax on distributed profits so that any who may benefit from devaluation, and more particularly from profit-making in dollar markets, may make their contribution to the Exchequer.

This blow to enterprise is required by the Labour Government if it is to maintain a policy of wage stabilization. Sir Stafford was crystal-clear on this. "It is, therefore, of critical importance that nothing—and I mean literally nothing—should be done to increase personal incomes arising out of profits, wages, or salaries, at least until we can see how far our policy has succeeded in bringing nearer a balance in our dollar sterling trade."

On the third day Mr. Oliver Lyttelton explained the Conservative attitude to the "wage freeze." He agreed that the total level of incomes should not rise, but that there was room for changes, up and down, within the overall total. The balance should favour workers in essential

industries at the expense of those in less essential industries. "If it was necessary to induce the transfer of workers into the export industries, there should be increased production in those industries through an increased working week or increased overtime, which would enable the wage-earner to have a larger wage-packet than if he remained in the non-essential industries." He estimated that Britain would require the equivalent production of over 600,000 workers if we were to bridge the gap. He considered that it would be impossible for such a number to be transferred, but a large number must be transferred or we faced disaster from the outset.

Mr. Lyttelton asked the Chancellor whether he was going to cut capital investment for industry or restrict it only to Government expenditure. If the first, it would be a further blow for industry, in the same way as the increased profits tax would make the accumulation of reserves more difficult and be a deterrent to enterprise at a time when more was necessary.

During the debate no Government spokesman gave any indication of the way cuts in capital investment are likely to fall. Similarly although a reduction in Government expenditure is promised, no details were vouchsafed. Both the Chancellor and the Prime Minister referred to the annual autumn departmental reviews and seemed to suggest that these reviews would provide the opportunity for departmental economies. These are hardly likely to be on a sufficient scale, and the Government's timorous approach to extravagant spending, which it now admits must be reduced, only serves to show that bold new policies are impossible until after the next election.

The Government secured a majority of 138 over the combined Conservative and Liberal Opposition vote of 212. Though the battle was won in the division lobbies, the Government has still to placate its supporters in the factories and homes of Britain.

Sun Company's Jubilee

ABOUT 350 people gathered at the Portchester Hall, London, W., on 30th September to celebrate the jubilee of the Sun Electrical Co., Ltd. Mr. A. G. Beaver, the chairman, who has been in charge of the company's affairs since its foundation on 8th August, 1899, presided at the function and during the supper interval briefly reviewed "Sunco's" history. He referred particularly to the many members of the staff who had served the company for very long periods, and expressed his regret that he and Mr. W. R. Rawlings were the only original directors remaining.

Mr. Beaver said that "Sunco" had not been content to follow other people but brought out their own specialities and marketed them. Before and during the first world war they manufactured many of their own designs of switchgear, accessories, signs, fires, etc.

In 1920 the organization was somewhat scattered with a works at Neal Street and a four-storey warehouse in Great St. Andrew's Street. Then they were able to acquire a large block of buildings, at the back of the original "Sunco House," stretching back to St. Giles's Church. In two stages, in 1921 and 1930, the majority of these buildings were demolished, rebuilt, and added to the original building, so forming a central headquarters with a total area of 40,000 sq ft.

On 11th October, 1940, the largest bomb which up to then had struck London fell in Charing Cross Road and brought down the front of their building. Fortunately none of the staff was injured and here Mr. Beaver paid a tribute to the staff for the way in which they carried on under great difficulties.

In a mention of the company's branches at Leeds, Newcastle and Slough, Mr. Beaver made appreciative references to the managers and he concluded by saying that although he was not now so closely associated with the day-to-day work, the company's affairs were in the good hands of Mr. Ralph Rawlings and Mr. Eric Beaver.

On behalf of the staff Mr. A. G. Owen (staff manager) asked Mr. Beaver to accept a clock as a token of their esteem. Mr. Beaver expressed his thanks and Mr. W. R. Rawlings also said a few words in his usual vigorous style.

Music for dancing was provided by Fred Butt and his band and a cabaret show added to the enjoyment of the evening.

E.C.A. London Branch

The annual dinner and ball of the London Branch of the Electrical Contractors Association will be held on 1st November at Grosvenor House, Park Lane, London, W.1.

Radiolympia

General Review of the Radio and Television Equipment at This Year's Show

By
W. E. MILLER,
M.A. (Cantab.),
M.Brit.I.R.E.

THIS year's Radiolympia exhibition, which is the sixteenth of the series organized by the Radio Industry Council (formerly the Radio Manufacturers' Association), opened at Olympia, London, on 28th September and closes to-morrow (Saturday). The official opening was by Mr. Herbert Morrison, Lord President of the Council. Later in the day the B.B.C. announced that the Sutton Coldfield television station, which is to serve the Midlands, would be opened on 17th December.

Undoubtedly the first impression one gains from the exhibition is that television has received considerable emphasis, though not to the exclusion of ordinary receiving sets, radiogramophones and other equipment. Practically all the large radio receiver manufacturers, and many of the smaller ones, are this year showing television. At the previous exhibition, two years ago, this was not the case.

One development of interest this year is projection television and about nine firms are showing models in which the projection arrangements are similar. The basis of the system is a 2½in projection cathode ray tube, operating at 25 kV. A very bright picture appears on the tube screen, and is reflected from a concave spherical mirror, via two plane mirrors, on to the back of a ground glass screen measuring about 15in by 12in. Spherical aberration is removed by means of a specially shaped corrector plate inserted in the path of the rays after they leave the first plane mirror.

In most cases these projection receivers have not yet been priced, though one (which includes also a radio receiver) will sell at £195 including purchase tax. Another projection receiver provides remote control of the brightness and contrast of the picture, enabling these to be adjusted whilst viewing at the correct distance from the screen.

In the main, the direct-viewing television receivers show very little change except in cabinet design. However, there are a few general trends, some of which have resulted in a slight lowering of the cost of production and others in improvements in picture quality.

The a.c./d.c. technique in which the valve and tube heaters are in series, and in which special means have been introduced to provide the e.h.t. supply to the tube has, by eliminating costly and heavy mains transformers, effected a saving in bulk, weight and cost. The e.h.t. supply of 5 to 7 kV is obtained in these receivers either from the line scanning circuit (where the high voltage produced at each flyback is utilized) or from an r.f. oscillator unit. Another method, which can be used in a.c. receivers, is by the use of dry rectifiers arranged in special voltage multiplying circuits.

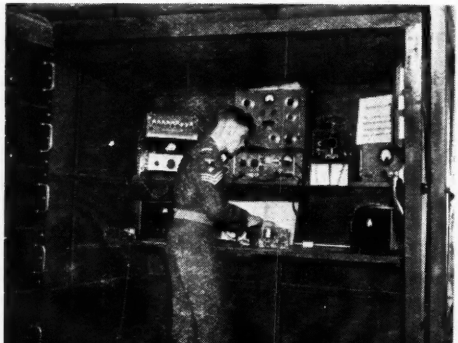
The use of miniature valves specially developed for television has enabled chassis dimensions to be considerably reduced, especially when the latest miniature components are also employed. Special attention has been paid in the circuitry to securing an accurate and stable interlace between the two frames of each picture, a feature which was not always achieved in early types of receivers. Permanent-magnet focusing has also been adopted in many of the new receivers, which has resulted in the focus, once adjusted, remaining accurate.

In general, tube sizes range from 9in to 15in in diameter. A high proportion of the sets exhibited have 10 or 12in

tubes, in either table or console cabinets. The new aluminized tubes, in which the fluorescent screen is backed by an aluminium deposit, provide pictures which are bright enough to be viewed comfortably in moderate daylight or artificial illumination.

An innovation in this country (though it is employed in some American models) is shown by one exhibitor. The screen is circular, and normally carries the usual rectangular picture. However, by operating a switch, the central portion of the picture is enlarged until it fills the whole of the circular screen. This is achieved by increase in the picture width and height in the correct proportion, and it naturally also increases the spacing between the lines.

Several manufacturers are showing table receivers with 9 or 10in tubes which sell at less than £50 including tax. The lowest priced television set at the show is a small 9in model priced at 35 guineas including tax. At the other end of the scale, large tube models housed in handsome cabinets which include radio receivers and record players may cost several hundred pounds.



R.E.M.E. are demonstrating on one of the two War Office stands a sectionalized screened cage containing instruments of the patterns employed for the alignment of an Army frequency-modulated pack transmitter-receiver

Another new development, shown by one exhibitor, is a range of television extension units which can be fed from any existing television receiver and provide television viewing in any other room in the house. The tube in the extension unit may be larger than that in the main receiver, and this provides a means whereby owners of 9in models can obtain a 15in tube picture without having to buy a complete 15in set. The extension of this system to the provision of television in blocks of flats is a logical development.

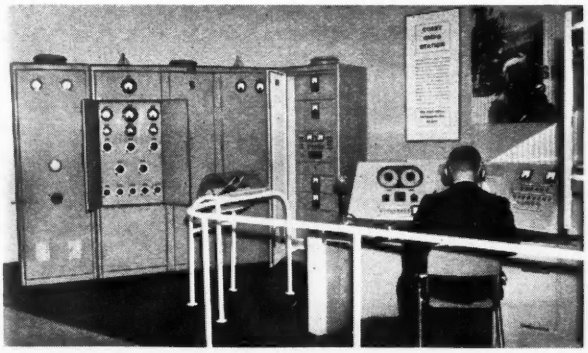
For the first time the home construction of television receivers is demonstrated on certain stands. Some of the technical journals, including the *Wireless World,* have developed sets for the amateur constructor and at this show several other exhibitors are offering constructional information and showing the built-up receivers in operation.

Before leaving the subject of television receivers, it may be pointed out that, with the forthcoming opening of the Birmingham station, it has been necessary for manufacturers to produce receivers for use in that area. In most cases separate models to operate on the Birmingham frequency are listed, though one manufacturer, at least, shows a receiver which can be switched to operate either at the London or the Birmingham frequency. Incidentally, the Birmingham station will provide a signal in which one sideband is almost suppressed which has necessitated a modification in the tuning arrangements in the receivers concerned.

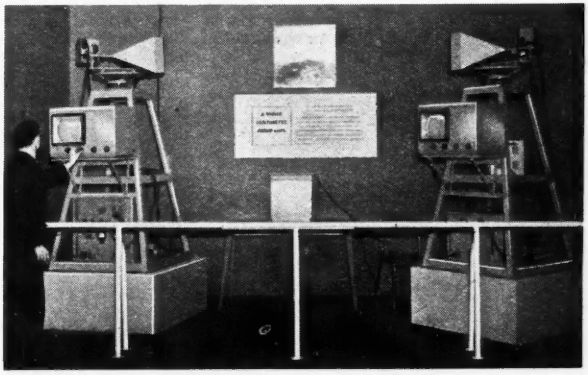
Television aerials in variety are to be seen at the show this year. Apart from the conventional dipoles, and dipoles with reflectors ("H" aerials), for outdoor use, many types of indoor aerials, quite effective in localities of good signal strength, are shown. For use in the so-called "fringe" areas of low signal strength, special aerial arrangements have been developed, in which either multiple reflectors, or a combination of directors and reflectors, are incorporated.

As might be expected, changes in radio receivers and radiograms are, on the whole, not of any very significant nature. There appears to have been a very successful attempt by a number of manufacturers, particularly in their export

models, to provide a more satisfactory short-wave performance by their receivers. Band-spreading, in which the significant sections of the short wave range of about 13 to 50 metres are spread



G.P.O. exhibit at Radiolympia. Above: a radio operator at the control desk of a Coast Radio Station set up to demonstrate the handling of distress messages from ships at sea. Relaying television programmes by radio was demonstrated with the aid of the 3cm relay link shown in the lower picture



out to occupy the full tuning scale width, is common. Some sets have six, eight, or even more bands in the short-wave range, and as each one takes up the full scale width, tuning is no more difficult than on the medium waveband. Furthermore, stations once found and identified can be accurately "logged" and found again with ease.

The separate bands are often selected by press-buttons, while on other sets press-buttons are used to select a few pre-tuned stations. There is, however, no real tendency towards a return to the many forms of elaborate automatic tuning which were very popular a year or two before the war. Where press-buttons are not employed, some form of rotary switching is used by certain manufacturers for selecting pre-tuned stations.

Some attempt appears to have been made to provide a reasonable degree of "high fidelity" by certain manufacturers. One model has a floor type baffle "cabinet" of unusual design, while many employ push-button output stages feeding one or more loudspeakers of satisfactory performance. There are also, of course, a number of exhibits of special high quality models developed by firms who specialize in this type of receiver.

Record reproduction has also received attention, and most modern radiograms are now fitted with light-weight pick-ups giving a performance which is a considerable improvement on earlier types, coupled with a notable reduction in record wear.

Table radiograms of compact design are shown by several manufacturers. Whilst the quality of reproduction given by these is generally lower than in the case of floor-type models, there is clearly a public demand for compact units of this nature.

Automatic record changers, which were not readily available at the time of the last show in 1947, are now to be seen in pre-war quantities. The newest models are considerably improved in reliability

and in most cases of much simpler design.

Apart from what may be termed the normal table model receivers, the exhibits include many compact portable and transportable types for bedside or room-to-room use. In the main these have moulded plastic cabinets, often in tasteful colours. They are mostly of the a.c./d.c. type, or dry battery operated. Some models are able to operate on mains or the self-contained batteries at will.

Another feature of this year's exhibition is the showing of various types of recorders. Apart from the disc types, which have been developed to a high degree of fidelity, there are the latest magnetic wire and tape recorders. Although most of the recorders shown are mainly for professional use, there appears to be an increasing public interest in them. The disc types shown are not to be confused with the simple models, little more than toys, which had a vogue just before the war.

Public address systems are also prominent at the show, together with relay systems and other forms of sound distribution. Loudspeakers, from miniature 2in models up to large public-address types show detail improvements, mainly in the magnet systems used, which employ the latest magnetic alloys of extremely high efficiency.

Components and Instruments

It is not possible to deal in detail with the wide ranges of radio components shown, but it is worth recording that the general tendency is towards a reduction in size and weight without loss in performance or reliability. The so-called "miniaturization" of components is reflected throughout the exhibition in the reduction in size and weight of equipment employing them. There is also a tendency to combine two or more components, such as resistors and capacitors, in a single casing for use as filter or coupling units, or similar purposes.

Radio valves have also been considerably reduced in size for use in television receiver and compact radio models. The very smallest types are employed, for instance, in deaf aids, while there is one battery radio receiver exhibited, incorporating four valves and their batteries, in a case similar to that of a deaf aid.

Specialized instruments are now largely employed for laboratory and service work on radio, television and electronics. Examples of the latest oscillographs, signal generators, multi-range test sets, square wave generators, bridges and many other instruments are to be seen on the stands of the instrument makers. Moderately-priced equipment in this class which before the war was imported from America is now available from a number of British manufacturers.

Commercial Equipment

In the National Hall of Olympia the exhibits are mainly specialized radio and electronic devices. V.h.f. radio communication equipment has been considerably developed since the war, and some fine examples of aircraft, mobile and commercial v.h.f. transmitter/receiver equipment are exhibited. Radio heaters of various types for industrial use, electronic control gear, timers for welding and other uses, and similar equipment have been developed by several firms and form interesting exhibits. Considerable work has been done on radio links, including multiplex types, and examples of these are exhibited. Finally, examples of certain types of nucleonic apparatus make their appearance for the first time.

This year the Services, the G.P.O., the Ministry of Supply, the Ministry of Civil Aviation and the Department of Scientific and Industrial Research are all represented at the exhibition by large stands containing exhibits, and manned by experts from the various bodies concerned. These exhibits are attracting considerable attention from visitors, who are seeing demonstrations of Naval, Army and Air Force equipment, a model of London Airport under working conditions, radar apparatus in use and other devices of particular interest.

Finally, the exhibition is having the full co-operation of the B.B.C., which is televising programmes from a large and fully equipped studio which can be seen in operation by visitors.

"Change Your Cooker"

Although the Eastern Electricity Board's "Change Your Cooker" campaign ran for only three months (May-July), consumers continue to respond. At the end of August 4,600 old cookers had been replaced by new models with automatic heat control.

Commerce and Industry

Forthcoming B.E.A. Report
Canadian Approvals System

LAST week in the House of Commons Mr. Raikes asked the Minister of Fuel and Power if he was in a position to state when the first annual report of the British Electricity Authority would be published. Mr. Gaitskell replied that he was unable to give a precise date but he hoped the report would be issued in about two months' time.

Exports to Canada

For the guidance of exporters of electrical equipment to Canada the British Standards Institution, 24-28, Victoria Street, London, S.W.1, has produced some notes on the Canadian approvals system to which all imported goods must conform. These set out a list of about eighty specifications covering a wide range of equipment, including motors, control and switchgear, installation material, domestic appliances, etc., and it is stated that copies of these can be obtained from the B.S.I. or seen at its library.

Particulars are given of the requirements of the Approvals Laboratory and the exemptions are noted, i.e., equipment for the sole use of electrical utilities themselves, for electric railway establishments, for mines, and for aircraft and marine work.

Commercial Photography

The electrical industry has provided a number of striking subjects for an exhibition of photography in commerce and industry which the Institute of British Photographers is holding at the Alpine Gallery, 74, South Audley Street, London, W.1, until 15th October. Power stations, especially Battersea, are a particularly popular choice, and there are several "shots" taken inside electrical factories. A view through a stator can always be counted on to make an effective picture, while a study of an electric furnace entitled "Inferno" taken in the Birlec works gives the photographic artist a further excellent opportunity to display his skill. Among other topics selected are arc welding, an oil-filled cable joint, television masts, a Wolf drill, a Cryselco lamp and carton, and a fluorescent lighting fitting detail (Merchant Adventurers of London, Ltd.).

New Siemens Lamp Factory

The new fluorescent lamp factory built by Siemens Electric Lamps and Supplies, Ltd., Preston, 600 yards from their main lamp factory, comprises many interesting features. On the ground floor of the two-storey building are laboratories for the production of fluorescent powder, glass and chemical stores and rooms for washing and coating the glass tubing with fluorescent powder. On the upper floor are the lamp and starter switch assembly processes. A functional plan has been adopted in plant layout and arrangement of electricity, gas, air and other services. Daytime lighting is excellent and the artificial lighting probably constitutes the largest installation of instant-start units yet made and gives approximately 25 lumens per sq. ft. An attractive colour scheme has been adopted for decoration and other arrangements for the welfare

Siemens' new Preston lamp factory

of employees have been carefully planned. The architect was Mr. A. C. M. Lillie. and the main contractors were T. Croft and Sons, Preston.

Electrical Employment

The number of persons employed in the electrical manufacturing, contracting and electricity supply industries in Great Britain in July totalled 716,700, according to the *Ministry of Labour Gazette*. This compares with 717,800 in the previous month and 721,900 in mid-1948. At 15th August there were 4,537 persons registered as unemployed in the electrical manufacturing industry, 1,333 in electrical wiring and contracting, and 692 in the electricity supply industry.

Lighting for Product Finishing

The use of fluorescent equipment for lighting a finishing department is shown in our illustration. This installation provides for lighting a body assembly and finishing line at Vauxhall Motors, Ltd., so that dents, bumps or minor imperfections, such as scratches on polished or semi-polished surfaces, can be detected easily and accurately. In this class of continuous flow production, imperfect work that is allowed to pass the inspection stage or beyond has to be refinished, either outside the normal schedule, or put back into it by readjustments. It is therefore economical to install a lighting system that will ensure that bad finishing can be detected at the appropriate stage.

Fluorescent lighting in the Vauxhall Motor factory

The visual problems involved in planning an installation of this type are more difficult to solve than those normally associated with general lighting of an interior, because the work involves horizontal, vertical and sloping surfaces, which may be flat, concave or convex. This means that the lighting must provide for easy viewing of positions.

Uniform intensity was also an important requirement and as it was essential to provide the right amount of upward illumination of the ceiling by diffusion to avoid harsh reflection contrasts, Crompton "Perspex" reflector fittings were selected, giving about 20 per cent of the light upwards. To give the best results the fittings, which are equipped with Crompton 80 W "daylight" fluorescent tubes, are tilted at an angle of from 10 to 15 deg. The installation was the result of joint planning by the electrical maintenance staff of Vauxhall Motors, Ltd., and the lighting engineers of Crompton Parkinson, Ltd.

Midlands Ideal Home Exhibition

A good selection of the latest electrical appliances is to be seen at the Midlands Ideal Home Exhibition which is being held at Bingley Hall, Birmingham, until 22nd October. Besides giving information and advice on electrical installations the Midlands Electricity Board provides an opportunity of inspecting many of the latest models of electrical appliances. On the stands of individual exhibitors, washing machines are particularly well represented, being displayed by Wilkins & Mitchell ("Servis"), Jewkes & Co., Ltd. (the "Bendix" machine being included with a display of various makes of vacuum cleaners, refrigerators, irons, toasters, clocks, etc.), the British Vacuum Cleaner & Eng. Co., Ltd. (who also show vacuum cleaners, refrigerators, clocks and "Teasmade" apparatus), Bailey & Turner, Ltd. (the Fisher machine, in company with "Coldstor" refrigerators) and N.E.P., Ltd. (together with vacuum cleaners and refrigerators). Vacuum cleaners and polishers are shown by Vactric, Ltd., while the "Turmix" mixer is demonstrated by E. J. Bowman (London), Ltd. A burglar alarm can be seen on the stand of Burgot Rentals, Ltd., and there are several comprehensive displays of radio equipment. Hearing aids

of the latest type are demonstrated by Ardente, Ltd., and Hadley Sound Equipments have on view various types of public address, staff location and intercommunication systems.

Northampton College Memorial

This evening (Friday) there is to be a service of dedication of the war memorial plaque of the Old Northamptonians' Association (past students of the Northampton Engineering College). The service is at 6 p.m. at the Martyrs' Memorial Church, St. John Street, Clerkenwell, E.C., adjoining the College. The major aspect of the memorial is the establishment of a trust fund for the purpose of sending postgraduate students to other countries to study industrial methods.

Batti-Wallahs' Society

The atmosphere at last week's luncheon of the Batti-Wallahs' Society had the authentic nautical flavour, when the guest of honour was Mr. Uffa Fox, whose reputation as a designer of yachts and as a yachtsman is of world renown. With the aid of lantern slides, Mr. Fox showed the various changes in the design of sailing vessels from Elizabethan to modern times, and his breezy style brought a touch of the sea to a very interesting story which revealed that British yachts and yachtsmanship still lead the world.

Lamp Publicity

The British Thomson-Houston Co., Ltd., has plans for a continuance of its extensive publicity for the encouragement of better lighting. For exterior publicity, the Mazda "Dancing Girl" will again be prominent. A scheme for large-scale billposting in selected large towns is in operation, including specially painted road signs. There will, in addition, be a return to the use of transparencies for affixing to car windscreens and shop windows.

Display material for window dressing will be available for normal and special occasions, and a new feature for this purpose is a large (29in high by 6ft long) screen known as the "Mazda" five-fold antique lamp display. This effective show piece is printed in colour and shows the development of lamps through the ages from the Roman pottery lamp of 400 B.C. to the present day fluorescent lamps. A number of informative and attractive publications are at present in course of production. A brochure on "Mazda" ship-lighting fittings has been issued within the past few weeks, and a re-issue of the lamp and lighting equipment loose leaf catalogue has also been completed recently. A new 52-page lamp catalogue in full detail will soon be available, as well as leaflets dealing with car bubs and with lamps for domestic use. A new edition of the popular B.T.H. "Pictorial Review of Lighting Installations," showing some of the latest lighting schemes installed in many spheres, will be published shortly.

All these various aspects of "Mazda" lamp publicity will link up with stands at many of the more important exhibitions throughout the country, as well as with the company's own lamp and lighting showroom, opened earlier this year at Crown House, Aldwych, London.

Education in Export

The Institute of Export has issued a syllabus setting out a course of study embracing the whole field of export practice and giving particulars of examinations for associate membership. Courses leading to the intermediate and final examinations of the Institute are being provided during the coming autumn and winter sessions at educational establishments in London and various parts of the country.

Practical Electrician's Pocket Book

The 1950 edition of this useful reference book, now in its 52nd year, contains among other new matter sections on the battery vehicle; electricity in horticulture, agriculture and dairy farming; electronics in industry; soldering and winding resistances. The mains voltage tables, listing over 5,000 places, have been reconstructed. The pocket book (price 5s) is published by *Electrical & Radio Trading*, 6, Catherine Street, London, W.C.2.

Farm Girl's Death

An inquest was held recently at Bourton-on-the-Water (Glos.) into the death of a nineteen-year-old girl, Ivy Joan Ward, employed at a local farm. The evidence (reported in the *Gloucestershire Echo*) showed that Miss Ward was found dead with burns on her left hand. She had been cleaning an electric milking machine. The doctor who examined the body said that in his opinion death had been caused by electric shock accentuated by the diseased state of the girl's heart.

Miss Ward's employer (Mr. G. S. Eaton) said that the power on his farm was supplied by an ex-War Dept. generating set at 230-240V. The milking machine had been supplied by temporary wiring and was switched off by withdrawing a fuse in the shed. It would have been possible to get a shock from touching the exposed terminals in a broken junction box if the current was switched on, but it was normally left switched off. The girl could not have re-

ceived a shock from picking up the cable. He said that he had had considerable electrical experience and did not think it possible to get a burn from 230V except in unusual circumstances when, for instance, a large area of skin was kept in contact with a metal surface.

Mr. H. Parker (Midlands Electricity Board) said that he had found the machinery and cable in good order. The fact that there was no "earth" on the machine (an absence which would not have been passed by the authorities) would not, he thought, have made any difference to the danger of receiving a shock. He thought that death might have been caused by loose terminals at the junction box. Mr. Eaton pointed out that there was no indication that any flash had occurred there.

The coroner returned a verdict of "Death by misadventure."

D.S.I.R. Report

The report for the year 1947-48 on the Activities of the Department of Scientific and Industrial Research (Stationery Office, 2s 2d by post, Cmd. 7761) is the first to be issued for ten years. It covers the change-over to war conditions and outlines the ways in which research was planned and carried out. The origin and early history of the movement are mentioned as well as firmly declared points of principle on which permanent collaboration is based. The main factors which have limited the development of D.S.I.R. plans, more especially in respect of long-range fundamental work, have been shortage of staff and lack of suitable buildings.

Trade Announcements

Tube Investments, Ltd., announces that its subsidiary, **A. P. Lundberg & Sons, Ltd.,** is transferring the whole of its manufacturing activity from its old works at Holloway, London, at the end of October to its works at Oldbury, Birmingham, which have been re-equipped and where new line production layouts have been installed, which are expected to double the present output capacity. Manufacturing facilities have also been made available for new ranges of electrical gear now being developed. When the transfer is completed the Holloway works will be closed down.

Smith's Electric Vehicles, Ltd., announces that Electric Vehicle Service (Birmingham), Ltd., Richard Street, Birmingham, 7, has agreed to undertake sales as well as service of N.C.B. vehicles in the Midlands.

Mr. P. Manton Edinborough, "Windlestone," Far Forest, nr. Kidderminster, has resigned his position with F. Westerman (Wholesale), Ltd., Birmingham, to commence business as a manufacturers' agent. As from 1st October he has been appointed sole Midland agent for British Electric Lamps, Ltd., and for Trevelyans (B'ham), Ltd. His telephone number is Rock 283.

Mr. F. Johnson, formerly sales representative with **Johnson, Pearce & Co., Ltd.,** left the employ of the company on 30th September.

Manchester Oil Refinery, Ltd., announces that its products are now marketed in the United Kingdom through Manchester Oil Refinery (Sales), Ltd.

Catalogues and Lists

Neo Electrical Industries, Ltd., 87/89, Corporation Street, Manchester, 4.—Priced folder on automobile electrical testing accessories and instruments.

General Accessories Co., Ltd., Barton Hill Works, Bristol, 5.—Priced catalogue of accessories for domestic, commercial and industrial installations.

Falk, Stadelmann & Co., Ltd., 91, Farringdon Road, London, E.C.1.—Catalogue of street lighting equipment.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 28th September:—

ARCASON. No. 678,758. Class 7. Electric dish-washing machines and parts.—B. D. A. F. Hopkinson and R. L. Carlstedt, trading as Arcason Co., Electroflo House, Abbey Road, Park Royal, London, N.W.10.

SUNVIC. No. 668,234. Class 9. Instruments and apparatus for measuring, indicating and controlling temperatures.—Sun-Vic Controls, Ltd., 10, Essex Street, Strand, London, W.C.2.

ACANA. No. 671,943. Class 9. Electrical apparatus and instruments included in Class 9. ACANA. No. 671,944. Class 11. Installations for lighting, heating, cooking, refrigerating, drying and ventilating.—Canaan, Ltd., 12-13, Henrietta Street, London, W.C.2.

ELMET. No. 673,362. Class 9. Electrical contacts made of metal, welding electrodes and electrical switchgear. — Cutanit, Ltd., 50, Gresham Street, London, E.C.2.

PULVECON. No. 675,042. Class 9. Electrical apparatus for use in photographic processes for exhausting and collecting powdered substances.—Hunter-Penrose, Ltd., 109, Farringdon Road, London, E.C.1.

NETTAGLOW. No. 676,904. Class 9. Electrical plug and socket connections and appliances for indicating current in electrical circuits.—Victor H. Iddon, Ltd., Harper Road, Wythenshawe, Manchester.

PELICAN. No. 677,531. Class 9. Electrode holders.—Arc Manufacturing Co., Ltd., 52a, Goldhawk Road, London, W.12.

No. 677,353 (design). Class 10. Electrically heated pads and blankets, etc., for surgical and curative purposes. No. 677,354 (design). Class 11. Electrically heated pads (not for surgical or curative purposes).—Denhams (Norwich), Ltd., Woodhouse Works, Todmorden, Lancs.

No. 669,647 (design). Class 11. Electrical appliances for boiling glue, bulbs for electric lamps, cooking apparatus, disinfecting apparatus, distilling apparatus, appliances for drying hair, electric ceiling pieces (lighting), fans, cooking utensils, etc.—Electrothermal Engineering, Ltd., 270, Neville Road, London, E.7.

VESTELLA. No. 671,223. Class 11. Electric lamps, lighting fittings and heaters.—H. Roscoe, 194, Oxford Street, Glasgow, C.5.

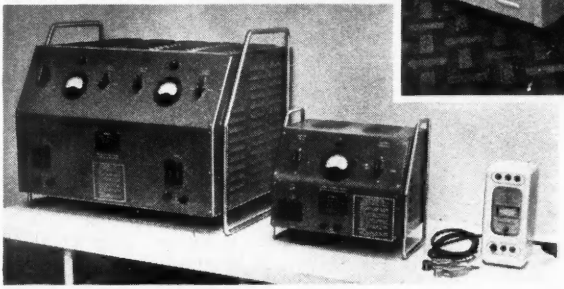
The Motor Show

Increasing Use of Electrical Equipment

ALTHOUGH the use of electrical equipment on cars continues to expand, a great part of the apparatus has now become largely standardized. Electric lamps, horns, fuel pumps, trafficators, windscreen wipers, radio sets, cigarette lighters, etc., are now taken largely as a matter of course, while such added conveniences as electric heaters, defrosters and clocks, and electrically-operated windows and hoods, are by no means uncommon. It is, therefore, not surprising that at the 34th International Motor Exhibition now being held at Earls Court, London, electrical interest centres largely on garage equipment.

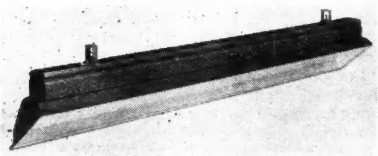
For petrol economy, a novel device called the "Autoscope" has been produced by Douglas Holt (Est. 1919), Ltd. This shows the driver whether the throttle is open to the correct degree for the speed and condition of the engine at any given time. If the accelerator is depressed too fiercely, too much or too little, tell-tale lamps light on the dashboard. A comprehensive range of fuel injection equipment, dynamos, starters, switch and fuse gear is shown by C.A.V., and the British Thomson-Houston Co.'s display of magnetos includes heavy-duty types and models for replacing existing coil ignition equipment.

Apart from introducing their new "Wind-



(Top) Crypton motor analyser. (Left) G.E.C. battery chargers. (Above) Heayberd mobile battery chargers with and without cowl

tone" horns, which are supplied in blended pairs, Joseph Lucas, Ltd., are demonstrating lamps with a new type of lens to divert the top part of the beam on to the road, thus increasing the brilliance of the lighting and reducing glare. Other especially interesting anti-dazzle, fog, etc., lamps, many of them designed to be built in the wings, etc., are to be found on the stands of But-



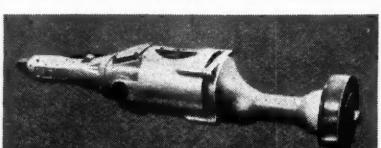
Benjamin "G" type angle "Flurolier"

lers, Ltd., Desmo, Ltd., and the Notek Electric Co., Ltd. Lamp bulbs designed to meet arduous road conditions are shown by the Edison Swan Electric Co., Ltd., Ceag, Ltd., and Rival Lamps, Ltd., demonstrations showing some of the stringent tests to which they are subjected.

A special feature of a greatly extended range of car radio sets made by E. K. Cole, Ltd., is the high degree of interference exclusion, reducing the need for suppression. Special models for export are included in the Pye Radio display, other exhibitors of this class of equipment being World Radio, Ltd., and Delco-Remy-Hyatt. "Morganite" television interference suppressors can be seen on the Edison Swan stand.

For use on trailers, B. Dixon-Bate, Ltd., have produced a combined over-run and electrically operated servo-action brake. Operated from a 6 or 12 V battery by means of a controller mounted on the steering column, it requires only 1½ A per brake to give a powerful controlled retardation. The use of the brake on the last of a train of wheels ensures straight-line braking and prevents any tendency to "jack-knife."

Batteries of all types are well represented by the Young Accumulator Co., Ltd., the Chloride Electrical Storage Co., Ltd., C.A.V., Ltd., Oldham and Son, Ltd., Peto and Radford, Ltd., the Edison Swan Electric Co., Ltd., Joseph Lucas (Batteries),

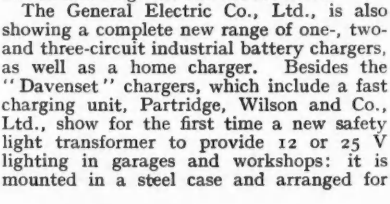


Wolf 4in portable grinder

Ltd., Park Bros., Ltd., Camel Accumulators, Ltd., Tungstone Products, Ltd., W. Gill and Co., Ltd., and others.

Among battery chargers is an oil-immersed unit designed for fitting on a car. This is made by Runbaken Electrical Products, whose fast and slow charger for service station use has now been fitted with a time switch and also cell testing, fast and low charge dials. A new range of five mobile chargers made by F. C. Heayberd and Co., Ltd., with outputs up to 30 A, can be supplied either with or without drip-proof cowl and illuminated panel; a time-switch and magnetic cut-out are fitted.

The General Electric Co., Ltd., is also showing a complete new range of one-, two- and three-circuit industrial battery chargers, as well as a home charger. Besides the "Davenset" chargers, which include a fast charging unit, Partridge, Wilson and Co., Ltd., show for the first time a new safety light transformer to provide 12 or 25 V lighting in garages and workshops: it is mounted in a steel case and arranged for



Runbaken industrial stoving oven gas igniter

direct connection to handlamp or overhead wiring system. The "Lo-Volt" safety handlamp shown by Lister Equipment, Ltd., is accompanied by a new watertight plug and socket especially suitable for garage washing bays and pits.

Prominently displayed among a complete range of lighting reflectors supplied by the Benjamin Electric, Ltd., for garages, service stations, car parks, etc., are the "Fluroliers" for fluorescent tubular lighting, including the new "G" type angle reflector. A heavy industrial type reflector with a two-piece "Perspex" reflector which can be removed for cleaning during working hours without switching off the lamps, is

one of the lighting fittings shown by the General Electric Co., Ltd., which is also making a special feature of a flameproof fitting with two 20 W fluorescent lamps and a 1½ft fitting, taking a 15 W lamp in a clear, reeded "Perspex" cover, suitable for use in caravans.

With the aid of the new "Unit" engine analyser made by Crypton Equipment, Ltd., it takes only 1¼ to 1½ hours to check the whole equipment of a car. This apparatus is obtainable in separate sections, comprising a coil tester, condenser tester, "Tach-Dwell" meter, combustion analyser, vacuum and fuel pump tester, compression gauge, timing light, and battery and starter tester. An engine analyser in unit form is also to be seen on the stand of Runbaken Electrical Products, in the company of a shock finder; an echo tester for armatures, stators and field coils; an instrument cleaner; a gas heat-treatment oven jet igniter; and a redesigned lathe. The "Octopus" electrical test bench (Armature Manufacturing Co.), provides most comprehensive testing facilities in its small compass. Philips Electrical show a new fault-finder for the first time.

Solder guns and a 4in hand grinder for fettling welded seams, a 7in horizontal sander and an angle high-speed valve seat grinder for use in confined spaces are new products of Wolf Electric Tools, Ltd., the recently introduced "GL3" lathe grinder attachment for centre grinding on 6in and 8in lathes and heavy-duty drills being also demonstrated. A new streamlined grinder so designed that it is possible to grind right into the side plates and so get a clean sweep across both wheels is a noteworthy exhibit of B. O. Morris, Ltd., who have in addition a new small flexible shaft machine for model makers, etc., a double oscillating handpiece for use with flexible shaft machines, and a backstand idler which greatly facilitates grinding and finishing work. Another backstand idler, this time for polishing after plating, is to be seen in the display of R. Cruickshank, Ltd., another of whose new products is a bright nickel plating tank. Attention is drawn to the new "Gleamax" bright nickel plating on W. Canning and Co.'s stand, where the equipment on view

Bowes "Lectoseal" electric vulcanizer

includes a chrome plating barrel and an eight-spindle automatic polishing machine. Welding plant designed for the motor trader is a speciality of Triangle Products, Ltd.

The Stenor "Weldmaster" and Romac "Elecstatic" electric vulcanizers are joined this year by the "Lectroseal" (Bowes "Seal Fast" Cpn. (Gt. Britain), Ltd.), for repairing covers, tubes and valves. It has a loading of 500 W and operates at a low temperature. To the "Kismet" range of air service equipment has been added the new "Speedair" portable electric compressor with a capacity of 2-3 cu ft.

East Midlands Programme

DURING the coming winter generating plant in the East Midlands Area of the B.E.A. will be increased by 230 MW, when new plant at Nottingham and Leicester and the new power station at Staythorpe, Notts, start operating. This information was given to the East Midlands Electricity Consultative Council on 28th September by Mr. W. S. Burge, the divisional controller. While this would not materially reduce cuts it would bring about improved voltage control, he said. The first 60 MW set was expected to come into operation in the middle or at the end of February, and a second 60 MW unit was follow towards the end of March. About the same time, two 30 MW generators at Leicester and a 50 MW set at Nottingham would also be put into commission.

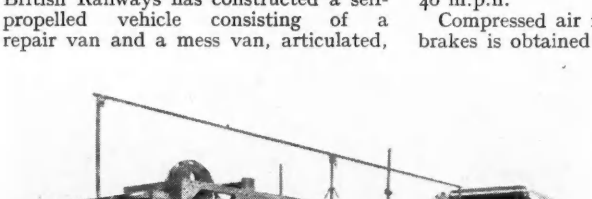
Speaking of delays, Mr. Burge said that they could design and build a station in three and a half years, but it took another one or one and a half years to get permits from the Ministry of Town and Country Planning and the like. He forecast that there would be power cuts until 1955. The East Midlands Area, with a plant capacity of 900 MW had extensions in hand totalling 850 MW. They had to select at least two new sites, but wherever they tried to negotiate there was an outcry.

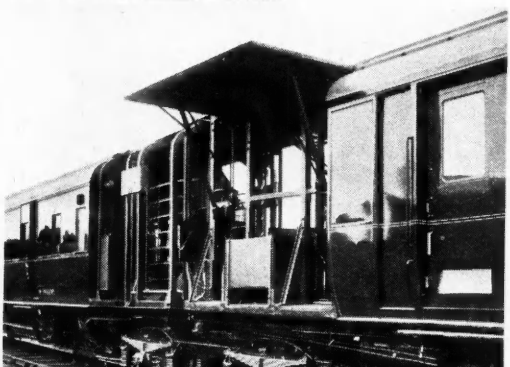
Finally Mr. Burge briefly mentioned new schemes for reinforcing mains, etc.

Railway "Wire Wagon"

Specially Contrived for Overhead Conductor Maintenance

TO facilitate the erection and maintenance of conductor wires suspended above electrified railway track, the London Midland Region of British Railways has constructed a self-propelled vehicle consisting of a repair van and a mess van, articulated, with driving compartments at each end. An independent vehicle for unreeling contact and catenary wires has also been built.





Wire wagon with sheeting supports in position and (right) side view of side platform and centre section

This vehicle is now in use on the Manchester (South Junction) to Altrincham electric line.

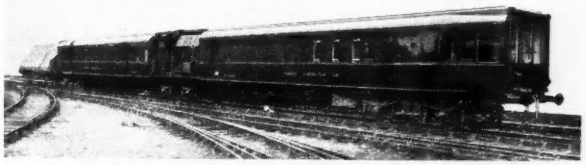
The use of new materials has been avoided as much as possible. For example, all power for lighting, heating and auxiliary services is obtained from a diesel generating set originally used for A.R.P. purposes. Propulsion is by two 125 h.p. diesel engines driving on to the articulated centre bogie through Leyland (Lysholm Smith) hydraulic torque convertors and reverse gear boxes, which arrangement provides the low speeds essential for overhead equipment maintenance and, at the same time, smooth acceleration up to 40 m.p.h.

Compressed air for engine control and brakes is obtained from six compressors, four of which are engine driven and two electrically driven from a lead-acid battery used for starting and in emergency only. Electro-pneumatic control is provided for the torque-convertor clutches, reversing, etc.

The driving compartments contain, in addition to the control gear, an electrically heated windscreen defroster and a microphone and speaker for communication with the "overhead crew" work-

ing on the flat roof, which is 5ft 4in wide by 130ft long. To facilitate work away from the vehicle, side flaps can be raised or lowered in a few seconds and a lift, manually operated from floor level and capable of dealing with a load of 10 cwt, gives an extra six feet in height above roof level.

As a safety precaution, an earthing trolley connects the contact wire to the running rails during examination of the overhead system; when not required, the trolley pole is depressed to roof level and held down by hooks. On the outside end-face of each driving compartment is adjustable roller mechanism for use during the erection or dismantling of contact wire or catenary.



General view showing wire wagon at rear under protective covering

In the repair van, which is a mobile workshop with bins for storage of simple fittings, there is a 7.5 kW diesel generator supplying a.c. at 230 V single phase for (1) charging through a metal rectifier the 14-cell lead-acid battery supplying the engine controls, emergency lighting and windscreen defrosters; (2) normal interior lighting at 230 V; (3) all interior heating at 230 V by means of standard tubular electric heaters; and (4) energizing 1,000 and 750 VA, 230/50 V, transformers from which all portable tools and floodlights are operated.

The second coach, converted for the domestic use of the maintenance staff and train crew, has a wash basin with piped cold water and cooking facilities. The "Loudaphone/Loudasound" communication system provides speakers and microphones in all sections and a portable hand microphone set which is plugged into convenient sockets on the roof. For work during the hours of darkness, 300 W 50 V floodlights are connected through sockets on the vehicle roof.

The wire wagon is a displaced 30ft coach with a new body fitted with two drum stands for contact wire up to 2,000 yards in length and facilities for storing lengths of wire recovered during renewals. Floodlight, intercommunication and ancillary circuits are through jumper cables from the parent vehicle. The compressed air brake includes provision for emergency application.

British Institute of Management

IN the course of his review of the work and policy of the British Institute of Management, at the annual meeting held in London on Wednesday last, Sir Charles Renold, chairman of the Council, said that three months ago a campaign was commenced for corporate subscribers, with gratifying results. The total number of corporate subscribers to date was about 350, including twenty-six associations and twelve trade unions, and a large proportion of medium-sized and small-sized companies. Further subscribers were being enrolled daily. Their present level of subscription stood at over £23,000.

Referring to the agreement with the Institute of Industrial Administration, designed to lead to eventual merger, Sir Charles said that under the agreement the revenues of the I.I.A., amounting to £12,000 a year, accrued to the B.I.M., which in return was responsible for meeting the running expenses of the I.I.A. The Baillieu Report contained an estimate of the total amount of Government aid required over the first five years, namely, £150,000—the equivalent of £30,000 a year. Expenses had risen substantially, but they had received an assurance from the Government that it would be prepared to make some increase in the total amount of the initial grant, while maintaining that the Institute should eventually become self-supporting. They estimated that if the Institute was to maintain and develop the work on which it had started a total annual income of not less than £100,000 would eventually be necessary.

Invitations had been sent out to persons holding chief executive responsibility in

undertakings of various sizes to become founder members. They now had approximately 500 founder members, and were not averse to increasing it to 1,500. In addition to the agreement with the I.I.A. they had taken over the functions of the British Management Council and the Confederation of Management Associations.

The Baillieu Report laid down that the ultimate aim of the Institute was to establish itself as a professional body having defined grades of membership. This was now being considered by the Membership Committee, and it was hoped that the Council would soon reach decisions on the fundamental principles involved.

Hampering Development

OVER-STANDARDIZATION AND RESTRICTIVE SAFETY REGULATIONS

THE inaugural address at Leeds this week of Mr. J. R. Rylands (E. Green & Son, Ltd.) as chairman of the North Midland Centre of the Institution of Electrical Engineers commenced with the question whether present-day safety regulations were not sometimes a little too far-reaching.

He sometimes wondered if the combined efforts of some of the standardizers and insurance companies would not in the end stifle development and progress to such an extent that British engineering would be forced into a disadvantageous and subsidiary position in the markets of the world. Some standardization there must be and many standards were needed, but it was possible to push standardization so far that it hampered development. Engineering equipment must be safe, but it was possible so to multiply safety regulations and precautions that the equipment became uneconomic. From the standpoint of export trade these matters could have serious and far-reaching consequences. He knew of instances in which certain insurance companies were actually trying to limit the pressure at which cast iron gilled tube economizers should operate to 450 lb/sq in, when these appliances had been working, on the Continent and elsewhere, for upwards of 20 years at 650 lb/sq in with complete success and safety.

He could multiply instances; the point was that there were doctrinaire and restrictive practices in the field of electrical and mechanical engineering as in other spheres of human activity, and they could in the long run be equally hurtful to the welfare of the community.

There was still scope for improvement in the mechanical engineering of electrical equipment. Electrical engineers tended to concentrate on increasing the efficiency of processes which were already highly efficient and to give insufficient attention to those which were inefficient.

Turning to the problem of economizer and air-heater availability, the chairman remarked that the detail design of plant was not nearly so fundamental a factor in the avoidance, for example, of bonded deposits as was at one time imagined. Some of the quite minor constituents of fuel might play the part of major irritants.

Various factors, among them the attempts to secure higher running efficiencies, had led to accentuated corrosion conditions at the economizer and air-heater end of the boiler plant, leading to rapid wastage of equipment in industrial plants as well as in power stations. In many instances the more extensive use of cast iron, either as a protective heating surface on steel tubes, or in the form of cast tubes, had been deemed to have advantages. The more extensive use of cast iron for high pressure work in this country tended to be hampered, as he had mentioned earlier, by the attitude of certain insurance companies. Persistence in this attitude might have serious results in the British export markets. Instances were already known of Dominion undertakings placing large orders with Continental makers for other types of plant. Inability to compete in overseas markets because of illogical restrictions imposed at home was not a desirable state of affairs.

Traction Statistics

A TOTAL of 59.1 million kWh (l.v.) was consumed for traction purposes in all regions of British Railways during the four weeks to 14th August. Figures given in the latest issue of "Transport Statistics" (British Transport Commission) show that this was 3.6 million kWh (6.5 per cent) more than in the corresponding period of 1948, although consumption per car mile (2.37 kWh) was just over 2 per cent less. The number of train miles run by electric coaching stock was 3,714,000 (9.16 per cent increase).

London Transport trolley-buses consumed 16.1 million kWh, or 2.65 kWh per bus mile (decrease of 1.71 and 1.12 per cent respectively). Consumption by trams amounted to 6.8 million kWh, equal to 2.69 kWh per car mile (decreases of 5.35 and 1.47 per cent).

Electricity Supply

Power Plant Contracts : Progress at Braehead

DURING the past month contracts have been placed by the British Electricity Authority for power station, switching and transforming station and transmission equipment amounting in the aggregate to £2,819,872. The principal contracts include: Feeder transformers, Bankside power station (Ferranti); two reinforced concrete chimneys, Brunswick Wharf power station (Tileman & Co.); auxiliary cables and earthing system, Brunswick Wharf power station (London Electricity Board); e.h.v. and h.p. steam and feed pipes, Battersea "B" power station, and piping equipment, Littlebrook "C" power station (Aiton & Co.); generator step-up transformers, Littlebrook "C" power station (Fuller Electrical and Manufacturing Co.); civil works in connection with the installation of two boilers and ancillary plant, Rotherham power station (Mitchell Construction Co.); cables and miscellaneous equipment, Brighton power station (Troughton & Young); superstructure, Keadby power station (Sir Robert McAlpine & Sons); 30 MVA, 132/33 kV transformers, East Yelland substation and 45 MVA, 132/33 kV transformers, Taunton substation (C. A. Parsons & Co.); 2,500 MVA, 132 kV switchgear, Langham (Oakham) substation (General Electric Co.); 30 MVA, 132/33 kV transformers, Altrincham substation, and 60 MVA, 132/33 kV transformers, Castleton substation (Ferranti); and 60 MVA, 132/33 kV transformers, Sale and Govan and Hagg's Road (Glasgow) substations (Metropolitan-Vickers).

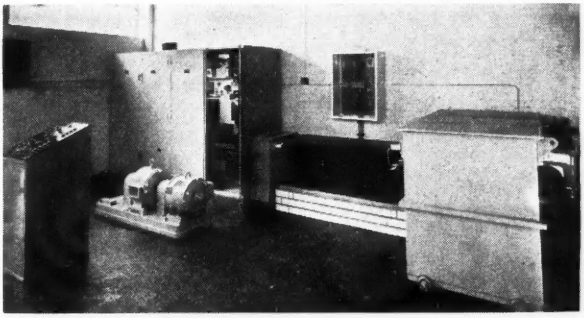
Hertford Lighting Policy

Figures presented to the Hertford Borough Council show that conversion of street lighting from gas to electricity on the existing basis would cost about £8,000. After meeting loan charges on this sum, however, there would be an annual saving of £327. The council has therefore agreed in principle to the adoption of electric street lighting throughout the borough. Planned improvements will also call for an additional 500 lighting units. The surveyor has recommended standard type concrete columns.

The Council's present agreement with the Gas Board expires in December and it is preferred to limit the number of gas lamps as far as practicable in the new agreement so that conversions can be carried out when opportunity permits.

Ripple Control

On 3rd October the Mayor of Birkenhead (Alderman L. Griffith Davies) performed the official conversion of a portion of the street lighting in Birkenhead to the "Rythmatic" ripple control system. This was the second stage in a programme which will ultimately embrace the whole of Sub-Area 3 of the Merseyside & North Wales Electricity Board, covering an area of 230 square miles.



"Rythmatic" injection equipment, Craven Street Substation, Birkenhead

The present installation comprises 127 G.E.C. 250 W horizontally burning high pressure mercury vapour lamps and 53 "Dilon" 500 W tungsten lanterns supplied by the B.T.H. Co. The control and injection equipment is housed in the Craven Street substation, Birkenhead. A total of twelve different signals is provided, of which three are used for street lighting. Other signals can be used for shedding load, such as water heaters, etc. Identical signals will ultimately be used for the control of street lighting throughout the whole of

No. 3 Sub-Area. The "Rythmatic" control equipment is manufactured by Automatic Telephone & Electric Co., Ltd., which was also responsible for the first stage of this programme, including the Wallasey district. The next area to be dealt with is Chester, which will complete the programme for the Sub-Area.

Overhead Line Sanctioned

The North of Scotland Hydro-Electric Board has been given authority by the Secretary of State for Scotland to erect an overhead line across land at Auchterarder belonging to Sir Douglas N. Reid in order to supply electricity to Newbigging Farm. This is the result of a public inquiry held at Auchterarder in July by Mr. H. A. Shewan, K.C., following the Board's application for compulsory powers owing to Sir Douglas Reid's refusal to grant the necessary wayleave.

Load Cuts

Further electricity cuts were again necessary in the North-Eastern Area last week, though in the main they were not heavy. On one occasion, however, when it is understood that trouble with generating plant at Dunstan power station had increased the need for load shedding, many of the factories on the Team Valley Trading Estate, Gateshead, were brought to a complete standstill.

London District Committees

The London Electricity Consultative Council has appointed District Committees in each of the London Board's seven sub-areas. At a Press conference last week Mr. I. J. Hayward, chairman of the Council, explained that the main function of the District Committees was to act as liaison. It was not proposed to invite the Press to the Committee meetings as minutes of the proceedings would be submitted to the quarterly meetings of the Council, which were open to the Press and public.

The Committees comprise Council members, together with representatives of local authorities, industry and commerce, and women's organizations. The members include Mr. T. Seymour, A.M.I.E.E., Morgan Crucible Co., and Mrs. Davis, E.A.W. (S.W. Sub-Area); Mr. F. T. Jackson, O.B.E., Telephone Manufacturing Co., Ltd. (Southern Sub-Area); Alderman C. Harvey, A.M.I.E.E., St. Pancras, and Mr. S. F. Bestwick, A.M.I.E.E., Carreras, Ltd. (N.W. Sub-Area); and Mr. K. Redgrave, M.C., M.I.Mech.E. (Sterling Electric Holdings, Ltd.).

Extensions at Pinkston

Glasgow Corporation Transport Department has now been authorized to proceed with the installation of additional generating plant at Pinkston power station. This equipment is expected to go into use in 1953.

Braehead Power Station

The accompanying photograph indicates the progress which has been made in the erection of the building of the new Braehead power station of the B.E.A. South West Scotland Division at Glasgow. Its publication now is timely in view of the appearance in this issue of the article dealing with the South West Scotland Area, and of the forthcoming visit of the Area Board chairmen and the British Electricity Authority to that Area.

The station has been designed for an ultimate plant capacity of 200 MW and is likely to be put in commission early in 1951 with an initial capacity of 100 MW.

The structural framework of the main building of the Braehead power station is now well advanced

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

The General Electric Co., Ltd.—Sir Harry Railing (chairman), in reviewing the 1948-49 accounts at the annual meeting on 29th September, said that the net profit, though less than in previous years, was considered satisfactory. The reduction was due to smaller profit margins; the turnover had exceeded that of the previous year. They produced more capital goods both for home and abroad, but a contraction took place in the home demand for consumer goods mainly on account of the electricity supply situation and the high purchase tax.

Sir Harry dealt at some length with the general trade outlook and the policy which must be adopted to maintain our standard of living, including the elimination of all national and industrial expenditure which was not absolutely essential. He said that we must increase the margin available for capital formation and consumption, and this could only be achieved by reducing national overheads and industrial production costs.

The company had increased its total production and production per man-year, but costs had increased at a greater rate than selling prices, largely due to increased prices of coal, services, wage advances and national services. Within the limits set to them they had progressed with modernization of plant in their works. The major building extensions at the Witton Works and at Fraser & Chalmers Works, Erith, were progressing according to programme.

They had launched out and extended on special lines, such as the new factory for electro-medical apparatus and Machlett X-ray tubes, on cathode ray tubes and on fluorescent lamps. Jointly with Associated Electrical Industries, Ltd., they had formed a new company, Glass Bulbs, Ltd., for the production of electric lamp bulbs. Each of the two ribbon machines now under construction would be able to produce 200 million bulbs a year, sufficient for the whole industry of the country. They had extended their manufacturing facilities abroad, especially in Australia, New Zealand, South Africa, India and Argentina, and had further strengthened their selling organizations throughout the world.

The Government set the target for export of electrical goods for 1949 at 291 per cent above 1938. Their total shipments in 1948-49 represented an advance of 313 per cent. Steady progress had been made in the expansion of turbo-alternator production, and many sets had been completed for service both at home and abroad. Further contracts had been received both from the B.E.A. and overseas customers. They had been entrusted with important work in connection with railway electrification at home and abroad. The Marine Section had in hand many large contracts.

The Fraser & Chalmers Engineering Works had received many important orders from South Africa, including large compressors and coal washing and handling plant. For the copper mines of Rhodesia they supplied an ore crushing machine weighing 145 tons operating 1,800ft below ground; since that three further orders had been secured for similar equipment in Australia and Sierra Leone. At home an extensive contract for the National Coal Board had been received for a complete coal preparation plant to the value of £500,000. Their telephone works had again received large orders for automatic telephone exchange equipment from the British Post Office and from overseas. The output value for the export market exceeded that of the previous year by 75 per cent.

Pirelli-General Cable Works had secured many contracts for power and Post Office cables. These included an order from the State Electricity Commission of Western Australia for 66,000 V oil filled cables; a submarine cable for 66,000 V to cross the Port Adelaide River; and oil filled cable for all voltages up to 132 kV for the B.E.A. Delivery was now being made of a contract worth £500,000 for 132 kV cable for the London district. Approximately one-third of the effort of the Research Laboratories was expended on development work for the Government.

The contract for the London-Birmingham television radio relay link was now in the final stages of completion. They were carrying out extensive field trials on very high frequency and ultra-high-frequency radio links for multi-channel telephony, including the newest forms of pulse modulation techniques. The Research Laboratories had designed and the Erith works had made an experimental gas turbine for the National Gas Turbine Establishment. The laboratories, in co-operation with Johnson Matthey

& Co., had established processes for the extraction of germanium in a very high state of purity.

Mr. Leslie Gamage (vice-chairman) seconded the adoption of the accounts which were approved.

The Electrolytic Zinc Co. of Australasia has announced a final dividend of 8 per cent on both the ordinary and preference, plus a bonus of 10 per cent, making a total distribution for the year of 25 per cent (against 15 per cent).

Ferranti, Ltd.—The report and accounts for the year ended 30th June last, now published, show a consolidated profit of £437,161, plus dividend and interest on unquoted investments of £1,924, making £439,085, as compared with £464,816 for the preceding year. The profit of the parent company was £479,496 (against £395,475), and the net balance, after providing for taxation, depreciation, etc., was £178,818 (against £143,388). General reserve receives £139,931, and the ordinary stock again receives a dividend for the year of 6 per cent, tax free. The balance carried forward is £74,459 (against £72,822 brought in). The losses incurred during the year by the subsidiary companies amounting to £45,791 have been deducted from the undistributed profits retained in their books. The contingency reserve of £150,000 and the capitalization by the Canadian company of $500,000 (£124,069) of its undistributed profits have now been added to general reserve, making that reserve £950,000.

In his statement, which has been issued with the report and accounts, Sir Vincent de Ferranti (chairman and managing director) says that the net increase of £257,684 in fixed assets is mainly accounted for by the completion of their foundry extensions and expenditure on the construction and equipment of the new transformer shop. It is hoped that the latter will be completed by the end of this year. The Canadian company has been passing through a period of reorganization and its trading results were adversely affected by labour unrest, culminating in two strikes occurring in May and June last. The company is again in production. Their small American company, on cessation of its war contracts, has not yet succeeded in finding sufficiently remunerative outlets for its productive capacity, and has closed the year with a net trading loss.

During the year the output of the parent company has remained constant, increases in transformers and Government work making up for reductions in electricity service meters, instruments, radio, domestic appliances and clocks. Of the total output 35 per cent has again been exported. They have been successful in their efforts to increase greatly their output of heavy plant, and to effect economies in departments suffering from falling demand, thereby giving a profit comparable with last year. They expect their output of transformers to continue increasing during the year ahead to deal with the record order book of the company.

The Telegraph Condenser Co., Ltd., is again paying an interim dividend of 5 per cent.

The Telephone & General Trust, Ltd., is maintaining its interim dividend at 3 per cent.

Ruston & Hornsby, Ltd., have received Treasury consent to a 100 per cent scrip bonus, and it is proposed to capitalize £2,050,000 of reserves for an issue of that amount in £1 ordinary shares on the basis of one share for every £1 of ordinary stock held.

A. C. Cossor, Ltd., announce that no dividend will be paid on the 6 per cent cumulative preference capital due on 30th September.

The Sturtevant Engineering Co., Ltd., has declared an unchanged interim dividend of 5½ per cent.

A. H. Hunt, Ltd. have announced an interim dividend of 7½ per cent, less tax (same).

New Companies

Electrical Services (Coxley), Ltd.—Registered 3rd September. Capital £1,000. Electrical engineers and general electrical installation contractors, lighting specialists, wireless engineers and service agents, etc. Directors: B. E. Thirtle and C. F. J. Young. Regd. office: 496E, Cowley Road, Oxford.

Mitchell Fittings, Ltd.—Registered 1st September. Capital £2,500. To acquire the business of a manufacturer of electric light fittings carried on by S. E. A. Mitchell at Gt. Horton as E. Mitchell. Directors: H. V. Wooler and E. A. B. Wooler. Regd. office: Town End Works, Great Horton, Bradford.

Electric Productions (Portman Square), Ltd.—Registered 30th August. Capital £1,000. Electrical engineers and contractors, manufacturers of and dealers in electrical accessories and instruments, wireless apparatus, etc. Subscribers: C. B. Harding and D. G. Buckmaster. Regd. office: 6, Broad Street Place, E.C.2.

Morrison Automatic Farm Light Co., Ltd.—Registered 1st September. Capital £1,500. To distribute and sell under licence an invention known as an automatic farm lighting plant, English patent No. 604899: and to carry on the business of electrical contractors, manufacturers, engineers, etc.

Directors: A. C. Morrison and J. Lilliman. Regd. office: 4, Wycliffe Street, Leicester.

Ingham & Owen, Ltd.—Registered 10th September. Capital £100. Electrical, radio and television engineers, etc. Directors: S. Collier and Mrs. Kathleen A. Collier. Regd. office: 46, Stockport Road, Levenshulme, Manchester.

Neo Art Industries, Ltd.—Registered in Edinburgh 5th September. Capital £500. Electrical engineers, lighting contractors and manufacturers, etc. Subscribers: N. S. Macdonald, 146, Park Road, Glasgow, and J. B. Dick.

Leonards Radio & Electrical, Ltd.—Registered 6th September. Capital £3,500. Directors: L. A. Atelson and Mrs. Elsie M. Atelson. Regd. office: 52, Norfolk Square, Brighton, 1.

Clare House, Ltd.—Registered 14th September. Capital £100. Lighting consultants, manufacturers of and dealers in electrical appliances and apparatus, etc. Directors: Elizabeth C. Hanley and H. H. D. Marshall. Secy.: Elizabeth C. Hanley. Regd. office: 4, Great Winchester Street, E.C.2.

R. J. Rampling & Sons, Ltd.—Registered 10th September. Capital £2,000. To acquire the business of a radio and electrical engineer carried on by R. J. Rampling at Downderry, Torpoint, Cornwall. Directors: R. J. Rampling and Betty M. Rampling. Regd. office: New House, Downderry, nr. Torpoint, Cornwall.

Bankruptcies

H. G. Benjamin, previously carrying on business at 38, Chapeltown Road, Leeds, as a radio and electrical engineer.—Receiving order made 19th September on debtor's own petition. Public examination 15th November at the Court House, Albion Place, Leeds.

E. D. S. Munday, 272, Lake Road, Portsmouth, electrical engineer.—Last day for receiving proofs for dividend 14th October. Trustee, Mr. A. L. Medcalf, 10, Rockstone Place, Southampton, Official Receiver.

Import Restrictions Relaxed

THE President of the Board of Trade (Mr. Harold Wilson) announced in the House of Commons on 29th September that the Government, to implement its obligation to contribute to the freeing of intra-European trade, had decided to remove import restrictions upon goods from those countries to which relaxation could be applied without the risk of our losing gold or dollars.

Goods which were not allowed to be sold in the home market, or of which production was limited, and articles for which there was a high export target, coupled with a large unsatisfied home demand, were not included in the list.

The relaxation would take the form of Open General Licences in general valid from 5th October. The following countries would be excepted from the scope of these licences:—

The United States, Canada, the Philippines, Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Venezuela, Argentina, Uruguay, Japan, Iran, Tangier, the French Somali Coast, Liberia, the U.S.S.R., Rumania, Bulgaria, Hungary, Czechoslovakia, Poland, Germany, Yugoslavia, Albania, Belgium and the Belgian Congo, Luxembourg, and Switzerland.

The list of goods to be freed from import restrictions is an extremely long and varied one. The following appear to be the items of electrical and allied equipment affected:

Group 8. Machinery and Plant.—Air conditioning machinery; electric lamp and valve making machinery; electrical machinery including generators, motors, converting machinery, rectifiers, transformers, starting and control gear for electric motors, switchgear and switchboards (other than telegraph or telephone); portable power tools; pumps, mechanical, of all kinds; rubber and plastic working machinery; turbines, gas, steam and water (non-marine); welding machines.

Group 9. Vehicles, etc.—Trucks, industrial, of the type used in factories, warehouses, railway stations, etc., but not including road vehicles.

Group 10. Glassware, pottery, etc.—Illuminating glassware—globes and shades.

Group 11. Medical, etc., appliances.—Electromedical apparatus; X-ray apparatus including tubes.

Group 12. Electrical goods.—Accumulators, lead-acid and alkaline; appliances of the kinds used for domestic purposes, the following: Blankets and pads, electrically heated, coffee percolators, fans, floor polishers, hairdressing appliances, irons, ironing machines, washing machines and wringers, kettles, shavers, toasters, vacuum cleaners and attachments therefor; batteries, primary; carbons (furnace, lighting and battery); electrodes (carbon and welding); hand lamps, pocket lamps, hand torches and inspection lamps operated by a dry battery, and cases; insulators and other articles of porcelain, earthenware or stoneware; insulating cloth or tape; lamps, filament or discharge (including fluorescent) and parts; lighting appliances and fittings; radio apparatus the following: Radio communication and navigational aid (including radar) equipment, radio receivers and transmitters, television receivers and transmitters, parts and accessories; wires and cables.

Group 13. Metal manufactures.—Boilers, steam; fuel economizers; pre-heaters; superheaters; and mechanical stokers.

Group 16. Miscellaneous.—Deaf aids.

FINANCIAL SECTION
STOCKS and SHARES

STOCK Exchange markets are taking matters quietly. Only in the South African mining market and in that for gilt-edged stocks is there any noticeable activity. The raising of the distributed profits tax from 25 to 30 per cent caused a fairly general fall in the ordinary shares of commercial and industrial companies, in which fall were included certain companies connected with the electrical industry. The emphasis laid by the Government on limitation of dividends makes a further factor of restraint, while fixation of prices for base metals served to arouse estimates as to how far these quotations will affect the profits of companies concerned with the metals. Putting it briefly, the air remains charged with uncertainty. Speculation runs upon the likelihood of a General Election in the near future or early next Spring.

Dividends and Rights

Automatic Telephone shares are quoted ex dividend and ex rights, at 50s middle. The price went ex rights earlier in this week, when about 9d was deducted from the previous price of the old shares. The new were offered in the proportion of 3 for 10 old shares, and at 50s. The price of the new shares is about 1s 3d premium.

General Electrics show a nominal fall on the month of 1s at 79s 6d ex dividend. The meeting was considered satisfactory. In the market, maintenance of the company's 17½ per cent dividend on the ordinary shares is regarded as being reasonably well assured.

Newman Industries ordinary went back to 3s on the board's decision not to pay an interim dividend this time.

More Profits Tax

A further increase in the tax on distributed profits, to 30 per cent, exercised a doubly reactionary effect upon most markets. It has unpleasant implications for companies that have been distributing a high proportion of their surplus profits; and, also, for those with a large amount of preference capital: the tax falls on preference dividends and has to be provided from the surplus otherwise available for the equity. Few of the popular electrical companies come to mind as being overburdened with preference capital and, so far as the earnings cover for current dividends is concerned, reference might be made to the tables published recently in this column showing a remarkably high and uniform conservatism in the dividends paid this year by the electrical manufacturers. Practical considerations apart, the increase has come as another discouragement to enterprise at the moment when this is most needed.

Shares and Yields

With companies like G.E.C. and English Electric very much to the fore in electronic developments, it is difficult to segregate radio and television as a field in itself for investment. A number of companies primarily concerned with it are, however, included in the adjoining list of shares, which shows considerable differences in terms of yield. Pye's 5s deferred shares receive consistently good support, and are currently in the lead with a yield of £4 4s 9d per cent. E.M.I. return a trifle less than 5 per cent, and always have the biggest following in the market. On Decca and Ekco the yields are 8 and 8½ per cent respectively. McMichaels pay over 12 per cent, while Cossor, Radio Trust, Ultra Electric and others are at present out of the dividend list.

The Month's Changes

The rise of 5s 6d in Aberdare Cables to 55s is an outstanding feature of the month's fluctuations. It is due to an increase in the interim dividend from 5 per cent to 12½ per cent. Hoovers at 32s 6d are 3s 9d higher. Pye deferred are a florin better at 29s 6d. Reyrolle at 60s 9d are 4s 6d up. Tube Investments are $\frac{1}{16}$ to the good at 5¾ after being a little over 6. Devaluation brought a rise of $4 in International "Tel. & Tel." to 19. Telephone Properties have been a good spot at 14s 6d on the 6 per cent dividend repetition. British Electric Traction deferred at 1545 is 60 points lower. Cable & Wireless rose 10, to 240; the directors' scheme is expected to appear next week.

Industrial Markets

In comparing present prices with those of a month ago, the accompanying share lists record on this occasion the results of sterling devaluation on the industrial market. In practice, the prices have failed signally to conform to theory. Industrials enjoyed a brief spurt immediately after the event, but had turned easier even before the Chancellor clapped another 5 per cent on the profits tax. They did so because of the generally expressed opinion that devaluation is worthless unless accompanied by internal measures to suppress the inflationary consequences, and that, if the latter run free, equities are no longer the escape-hatch they used to be before the days of dividend limitation, controls and crushing taxation.

Electrical Investments

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 3rd Oct. 1949	Month's Rise or Fall	Yield £ s. d.
Overseas Electricity Companies					
Atlas Elec.... ...	2	2½	13/6	+1/6	3 14 1
Calcutta Elec. ...	6†	6†	24/6	−6d.	4 18 0
Cawnpore Elec. ...	13	10	36/3	+⅛	5 10 6
East African Power	7	7	40/9	—	3 8 8
Jerusalem Elec. ...	5	6	17/–	−6d.	—
Madras Elec. ...	8	5	30/–	+¼	3 6 8
Nigerian Elec. ...	12½	10	35/–	+4/3	—
Palestine Elec. "A"	7†	Nil	28/6	−2/–	—
Perak Hydro-Elec.	Nil	Nil	12/–	+1/6	—
Whitehall Inv. Pref.	—	6	23/–	—	5 4 4
Equipment and Manufacturing					
Aberdare Cables ...	10	15	55/–	+5/6	5 9 1
Aron Elec. Ord. ...	15	15	40/–xd	—	7 10 0
Assoc. Elec. Ord. ...	15	15	75/6	+4/–	3 19 4
Automatic Tel & El.	12½	12½	50/–xr	—	—
Babcock & Wilcox	15	15	62/–	+4/9	4 16 9
Baldwin, H. J. (2/–)	25	25	5/9	−6d.	8 14 0
British Aluminium	10	10	42/3	−9d.	4 14 9
B.I. Callender's ...	6⅔	6⅔	31/–	−1/–	4 7 0
British Thermostat (5/–)	23½	25	23/9	—	5 5 3
British Vac. Cleaner (5/–)	20	20	9/–	+1/–	11 2 2
Brush Ord. (5/–) ...	—	10	6/6	+6d.	7 13 10
Burco (5/–) ...	35	35	20/–	+⅛	8 15 0
Chloride El. Storage	20	20	92/6	—	4 6 7
Cole, E. K. (5/–) ...	22½	20	12/–	+⅛	8 6 8
Cossor, A. C. (5/–) ...	Nil	Nil	7/6	+2/–	—
Crabtree (10/–) ...	17½	17½	33/6	+1/–	5 4 6
Crompton Parkinson Ord. (5/–) ...	22½	22½	24/6	+1/–	4 12 0
De La Rue (5/–) ...	50	50	22/6	−3/3	11 2 1
Decca (1/–)... ...	112½	112½	14/–	+3d.	8 0 8
E.M.I. (10/–) ...	6	8	16/3	+⅛	4 19. 3
Electrical Components (5/–) ...	20	20	10/9	—	9 6 0
Elec. Construction	12½	12½	49/6	—	5 0 10
Enfield Cable Ord.	7½	7½	28/9	+6d.	5 4 4
English Electric ...	10	10	46/6	+1/6	4 6 0
Ericsson Tel. (5/–)...	20†	20†	40/9	−6d.	2 9 1
Ever Ready (5/–) ...	40	40	29/–	+1/6	6 18 0
Falk Stadelmann ...	15	15	38/9	+1/9	7 14 8
G.E.C. Ord. ...	17½	17½	79/6	−1/–	4 8 0
General Cables (5/–)	50	50	18/9	−⅛	—
Greenwood & Batley	15	15	46/3	—	6 9 10
Hackbridge Cable (5/–)	—	20	13/9	+6d.	7 5 6
Hackbridge Hewittic (5/–)	12	12½	11/6	+6d.	5 8 8
Hall Tel. Acc. (10/–)	10	10	13/6	+6d.	7 8 2
Heatrae (2/–) ...	12½	12½	4/–	—	6 5 0
Henleys (5/–) ...	20	20	24/–	+6d.	4 3 4
Hoover (5/–) ...	40	40	32/6	+⅛	6 3 0
Intl. Combustion (5/–)	37½	37½	19/6	—	4 16 2
Johnson & Phillips	15	15	62/6	—	4 16 0

Company	Dividend Previous	Dividend Last	Middle Price 3rd Oct. 1949	Month's Rise or Fall	Yield £ s. d.
Equipment and Manufacturing (continued)					
Lancashire Dynamo	22½	22½	95/–	—	4 14 3
Laurence, Scott(5/–)	12½	12½	12/6	+3d.	5 0 0
London Elec. Wire	10	10	45/–	+1/–	4 9 0
J. Lucas	17½	17½	81/3	+⅜	4 6 2
Mather & Platt ...	11	11	50/–	+⅛	4 8 0
Metal Industries ...	10	10	42/6	—	4 14 1
Mid. Elec. Mfg. ...	35	35	8¼	—	4 5 0
Murex	20	20	45/–	—	4 9 0
Newman Ind. (2/–)	22½	17½	3/–	−1/–	—
Oldham & Son (1/–)	60	60	11/3	+1/9	5 5 3
Plessey (5/–) ...	20	20	13/9	—	7 5 5
Parsons C. A. ...	12½	12½	61/3	+½	4 1 7
Pye Deferred (5/–)...	25	25	29/6	+2/–	4 4 9
Radio & Tel. (2/–)	Nil	25	2/–	—	—
Revo (10/–) ...	27½	27½	48/9	−⅛	5 12 9
Reyrolle	12½	12½	60/9	+4/6	4 2 3
Scophony Baird (1/–)	—	—	3/–	+6d.	—
Scot. Cable (4/–) ...	30	30	21/–	−1/6	5 14 3
Siemens Ord. ...	7½	7½	31/3	—	4 16 0
Switchgear & Cowans (5/–)	20	20	12/–	—	8 6 8
T.C.C. (10/–) ...	15	15	32/6	—	4 12 4
T.C. & M.	10	10	42/–	+9d.	—
Telephone Mfg. (5/–)	9	9	8/6	—	5 6 0
Thorn Elec. (5/–) ...	25	20	16/3	—	6 3 1
Tube Investments...	25	25	5⅜	+⅛	4 7 0
Vactric (5/–) ...	Nil	Nil	12/–	−3/9	—
Veritys (5/–) ...	5	5	2/9	—	9 1 10
Walsall Conduits (4/–)	70	70	56/3	—	4 19 8
Ward & Goldstone (5/–)	50	50	47/6	+3/–	5 5 3
Watford (2/–) ...	15	20	6/6	+6d.	6 3 1
Westinghouse Brake	14	14	63/9	+1/9	4 8 1
West, Allen (5/–) ...	10	10	12/–	+1/9	4 3 4
Transport and Communications					
Anglo-Am. Tel.: Pref.	6	5⅝	105	−1	—
Def.	1½	1½*	12½	−5	—
Anglo-Portuguese...	8	8	27/–	+3/3	5 18 6
Brit. Elec. Traction: Def. ord. ...	50	50	1545	−60	3 4 9
Calcutta Trams ...	Nil	6+	25/9	+3/3	4 13 2
Cape Elec. Trams ...	6	6	26/–	+1/8	4 12 4
Cable & Wireless: 5½ Pref. ...	5½	5½	105	−2	5 4 9
Ord.	4	4	240	+10	—
Globe Tel. &Tel. Ord.	5†	5†	42/6	+¼	2 7 0
Great Northern Tel. (£10)	12	7	12	—	5 16 8
Inter. Tel. & Tel. ...	Nil	Nil	19	+4	—
Marconi Marine ...	7½	7½	25/–	−9d.	6 0 0
Oriental Tel. Ord. ...	10	16	45/3	+9d.	7 1 8
Telephone Props ...	6	6	14/6	+5/–	8 5 6
Tele. Rentals (5/–)...	10	10	9/3	−3d.	5 8 1

*Dividend postponed.

†Dividends are paid free of Income Tax.

Next Week's Events

Monday, 10th October

BIRMINGHAM.—Grand Hotel, 6 p.m. I.E.E. South Midland Centre. Chairman's address by J. W. Donovan and annual general meeting and conversazione.

BRISTOL.—Electricity House, Colston Avenue, 6 p.m. I.E.E. Western Centre. Chairman's address by L. Burdes.

MANCHESTER.—At the Manchester Geographical Society, 16, St. Mary's Parsonage, 7.30 p.m. Junior Institution of Engineers, North-Western Section. Annual general meeting followed by presidential address by J. Grayston.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. Chairman's address by T. E. Daniel.

READING.—Great Western Hotel, 7 p.m. Institution of Electrical Engineers. District meeting. "Some Engineering Features of the British Grid System," by R. H. Abell.

Tuesday, 11th October

BELFAST.—Queen's University, 6.45 p.m. I.E.E. Northern Ireland Centre. Chairman's adrress by Col. H. B. Somerville.

CAMBRIDGE.—Cambridgeshire Technical College, 6 p.m. I.E.E. Cambridge Radio Group. Chairman's address by C. W. Oatley.

CARDIFF.—Park Hotel, Park Place, 6.30 p.m. I.E.E. Cardiff Students' Section. Inaugural address by the chairman, J. C. Towler.

GLASGOW.—At the Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, 7 p.m. I.E.E. Scottish Centre. Chairman's address by Professor M. G. Say.

LONDON.—Savoy Place, London, W.C.2, 5.30 p.m. I.E.E., Measurements Section. Chairman's address by Prof. J. Greig.

At the Royal Society of Arts, W.C.2, 6 p.m. Illuminating Engineering Society. Presidential address by Dr. J. N. Aldington.

85, Minories, E.C.3. 5.30 p.m. Institute of Marine Engineers. Presidential address by Lord Rotherwick.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Utilization Group. "The Automatic Control of Lead-Acid Battery-charging Equipment," by R. A. Harvey.

NOTTINGHAM.—Gas Demonstration Theatre, 6.30 p.m. I.E.E., East Midland Centre. "Selection of Transformers for Use in Distribution Networks, with special reference to the New Low-voltage Standard of 240 Volts," by E. Tobin.

WOLVERHAMPTON.—Midland Electricity Board Service Centre, Darlington Street, 7 p.m. E.P.E.A. Midland Technical Group. Two sound films, "Electronics," and "Electronics in Industry."

Wednesday, 12th October

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. Chairman's address by J. S. Kilpatrick.

BRADFORD.—Midland Hotel, 7.30 p.m. A.S.E.E. Bradford Branch. "Mechanical Refrigeration," by L. L. Emmett.

EDINBURGH.—Heriot-Watt College, 7 p.m. I.E.E. Scottish Centre. Chairman's address by Prof. M. G. Say.

FARNBOROUGH.—R.A.E. College, 6.30 p.m. I.E.E. Southern Centre. "The Motor Uniselector and the Technique of its Application in Telecommunications," by W. H. Grinsted.

LONDON.—I.E.E. London Students' Section, 2.15 p.m. Visit to G.E.C. Research Laboratories, Wembley.

35, Grosvenor Place, S.W.1, 7 p.m. Women's Engineering Society, London Branch. "Women and Housing."

PRESTON.—Harris Institute, Corporation Street, 7 p.m. I.E.E. North Lancashire Sub-Centre. Chairman's address by G. A. Robertson. (Visit of president.)

SHEFFIELD.—Grand Hotel, 6.15 p.m. I.E.E. Sheffield Sub-Centre. Chairman's address by J. R. Phillips.

Thursday, 13th October

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 6 p.m. Association of Mining Electrical and Mechanical Engineers, South Wales Branch. "Magic Means for Engineers, Draughtsmen and Surveyors," by E. H. Hassler.

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Chairman's address by J. S. Kilpatrick.

LONDON.—Savoy Place, London, W.C.2, 5.30 p.m. I.E.E., Utilization Section. Chairman's address by C. T. Melling.

At the London School of Hygiene and Tropical Medicine, Gower Street, W.C.1, 6.30 p.m. British Institution of Radio Engineers. "An Experimental Study of the Magnetic Amplifier," by E. H. Frost-Smith.

SWANSEA.—Central Public Library, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. Chairman's address by B. S. Gylee.

Friday, 14th October

LONDON.—Savoy Place, London, W.C.2, 5.30 p.m. I.E.E. Education Circle. Discussion on "The Application of Psychological and Other Tests to the Selection of Students for Courses and to Vocational Guidance." To be opened by D. Smith.

At the Royal Society of Arts, W.C.2, 7 p.m. Institution of Electronics. "Photographic Flash Units," by H. K. Paul.

Saturday, 15th October

LEEDS.—Yorkshire Electricity Board offices, Whitehall Road, 2.30 p.m. I.E.E. North Midland Students' Section. Chairman's address by G. B. Downham.

LONDON.—I.E.E. London Students' Section, 10 a.m. Visit to the establishment of Arthur Guinness, Son & Co., Ltd., Park Royal, N.W.10.

Western Europe Engineering Conference

A CONFERENCE was held in London from 19th to 23rd Sept. at the invitation of the Institutions of Civil, Mechanical and Electrical Engineers, acting as hosts, of representatives of engineering societies in Belgium, Denmark, France, Holland, Norway, Sweden Switzerland, United States (Engineers' Joint Council) and the three British Institutions. It was a resumption of the meeting of October, 1948, and questions discussed included policies and means by which engineering institutions may more effectively accomplish the purposes for which they were founded.

A memorandum was drawn up, for submission to the governing bodies of the societies represented, for regulating the future activities of the conference. It was agreed to maintain effective contact with other conferences of a similar kind which take place in other regions and the Joint Council of Finnish Engineering Societies is to be invited to participate. The setting up of "working parties" to consider matters that need study was agreed to.

It has been decided that the next meeting of this Conference shall be held in Holland in the autumn of 1951.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

16258 British Thomson-Houston Co., Ltd.—Alternating current control apparatus particularly for arc welding. 28th August, 1943. (629284.)

1945

1857. British Thomson-Houston Co., Ltd. (General Electric Co.).—Luminescent materials. 23rd January, 1945. (629155.)

12082. Goldstaub, H. H.—Means for retaining electronic valves in position against vibration and shocks. 14th May, 1945. (629285.)

14155. British Thomson-Houston Co., Ltd.—Electric circuits for voltage regulating systems. 6th June, 1944. (629227.)

20472. Goldstaub, H. H.—Means for retaining electronic valves in position against vibration or shocks. 9th August, 1945. (629229.)

26951. Akt.-Ges. Brown, Boveri & Cie.—Device for preventing the formation of brush discharges. 14th October, 1944. (629237.)

27610. Philco Corporation.—Electron-discharge devices. 31st August, 1944. (629238.)

29383. Spurrier, C.—Television studios. 5th November, 1945. (629239.)

31253. Telefonaktiebolaget L. M. Ericsson.—Electromagnetic relays. 22nd November, 1944. (629286.)

32042. Ransburg, H. J., Ransburg, H. G., Ransburg, H. P., and Ransburg, E. M., (trading as H. J. Ransburg Co.).—Methods and apparatus for coating articles electrostatically. 26th January, 1945. (629241.)

1946

1984. Standard Telephones & Cables, Ltd., Dunn, R. H., and McWhirter, E. M. S.—Electrical measuring circuits. 21st January, 1946. (629244.)

1985/6. Standard Telephones & Cables, Ltd., Dunn, R. H., and McWhirter, E. M. S.—Measuring devices. 21st January, 1946. (629245/6.)

2876. British Thomson-Houston Co., Ltd. (General Electric Co.).—Wave-form modifying systems. 29th January, 1946. (629160.)

8811. Rust, H. M., and Gregory, M. C.—Radio mirrors. 21st March, 1946. (629108.)

12033. Benjamin Electric, Ltd., and Fenn, J. J.—Electric light fittings. 18th April, 1946. (629166.)

12796. Dryden & Sons, Ltd., T., and Barrs, J. W.—Electric heaters. 29th April, 1946. (629253.)

14197. Standard Telephones & Cables, Ltd., and Dunn, R. H.—Electric signalling systems. 10th May, 1946. (629254.)

14561. Standard Telephones & Cables, Ltd., and Dunn, R. H.—Electric impulse frequency changing devices. 14th May, 1946. (629255.)

16060. Elliott Bros. (London), Ltd., and Pizzey, C. F.—Electrical apparatus for amplifying small d.c. voltages or currents. 27th May, 1946. (629287.)

18737. Standard Telephones & Cables, Ltd., McWhirter, E. M. S., and Dunn, R. H.—Electric signalling or control systems. 21st June, 1946. (629260.)

23856. Murphy Radio, Ltd., and Bissmire, H. G. T.—Apparatus used for adjustment of radio apparatus. 12th August, 1946. (629267.)

25245. British Thomson-Houston Co., Ltd.—Magnetometers. 24th August, 1945. (629270.)

28009. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Blocking-layer rectifiers. 26th June, 1941. (629275.)

29766. Beveridge, H. N.—Electrical measuring instruments. 29th October, 1945. (629279.)

30864. Marconi's Wireless Telegraph Co., Ltd.—Signal transmission systems. 31st October, 1945. (629174.)

31034. Bryans Aeroquipment, Ltd., and Harland, A. B.—Piezo-electric devices for recording and reproducing sound. 18th October, 1946. (629288.)

31796. Langrish-Smith, W. E., and Frost, W.—Electrically heated vulcanizers. 25th October, 1946. (629289.)

33996. Siemens Bros. & Co., Ltd., and Hensler, B. A.—Telephone systems. 15th November, 1946. (629293.)

34712. British Thomson-Houston Co., Ltd., Jewitt, D. E., Barwick, E. C., Adkins, B., and Bourne, S. N.—Automatic control system for ship propulsion. 22nd November, 1946. (629295.)

34725. Ruths International Accumulators, Ltd. (Wiener Lokomotivfabrik Akt.-Ges.). — Apparatus for electrically heating high-pressure steam generators or high-pressure steam accumulators. 22nd November, 1946. (629296.)

35799. Nalder Bros. & Thompson, Ltd., and Lipman, C. L. — Electrical measuring instruments and relays. 3rd December, 1946. (629299.)

36228. Cook, F. L.—Electrical snap-acting switches. 8th December, 1945. (629300.)

37585. Marconi's Wireless Telegraph Co., Ltd., and Clough, N. H.—Navigation aiding radio systems. 20th December, 1946. (629304.)

1947

1909. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. — Measuring instruments, containing coreless moving-coil systems. 1st December, 1945. (629182.)

2153. Philips Lamps, Ltd.—Trimmer condensers. 27th December, 1943. (629114.)

2329. Dowsett Engineering Construction, Ltd., and Dowsett, H. L.—Poles for telegraphic and like overhead transmission and for similar purposes. 24th January, 1947. (Cognate application 2938/47.) (629115.)

2550. Ferguson, Pailin, Ltd., McNeill, W. A., Maass, H. F., and Berry, C. H.—Construction and testing of high voltage insulators. 27th January, 1947. (629162.)

3719. Noyes, R. C. (Telefonaktiebolaget L. M. Ericsson).—Apparatus for the determination of the moisture content of particulate or granular substances. 7th February, 1947. (Convention date not granted.) (629183.)

3810. Mackay, D. M.—Communication systems utilizing pulse modulation. 10th February, 1947. (629347.)

4446. Automatic Telephone & Electric Co., Ltd., and Campbell, C. F.—Thermionic valve oscillator circuits. 15th February, 1947. (629349.)

4502. Soc. Anon. A. Citroen. — Electromagnetic clutches, particularly for motor vehicles. 14th March, 1946. (629311.)

5596. Mond Nickel Co., Ltd.—Bimetallic elements. 15th March, 1946. (629117.)

5738. Thorn Electrical Industries, Ltd., Bell, T. F. P., and Kember, R. C.—Fittings for electric-discharge lamps. 27th February, 1947. (629351.)

5809. Ericsson Telephones, Ltd., Drysdale, L. H., and Stevens, J. R. H.—Burglar, fire or like alarm systems. 28th February, 1947. (629314.)

6690. Metropolitan-Vickers Electrical Co., Ltd., Craggs, J. D., and Jaffe, A. A.—Geiger-Mueller counters. 10th March, 1947. (629317.)

7451. Philips Lamps, Ltd.—Electrolytic condensers. 19th May, 1944. (629186.)

8097. Phillips Lamps, Ltd.—Circuit arrangements for indicating the frequency of electrical oscillations. 15th July, 1944. (629322.)

Marconi's Wireless Telegraph Co., Ltd., and Head, L. R.—Multiple coil wave change arrangements suit-

able for use in multi-range ultra-high-frequency radio and like receivers. 25th March, 1947. (629124.)

9713. Standard Telephones & Cables, Ltd.—Direct coupled thermionic valve amplifier. 27th July, 1946. (629357.)

9892. British Thomson-Houston Co., Ltd., and Vause, A. S.—Cathodes for electric-discharge devices. 14th April, 1947. (629126.)

10028. May, P. (Robertshaw Thermostat Co.).—Electric heating systems for cooking appliances. 15th April, 1947. (629127.)

10769. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey.—Electric heating elements and method of producing the same. 22nd April, 1946. (629188.)

10910. Whitby, E.—Method of and apparatus for electric local and/or remote control. 23rd October, 1947. (Cognate application 25530/48.) (629359.)

11131. Siemens Bros. & Co., Ltd., Rosen, A., and Fee, D. G.—Fluid-tight casings for submarine cables. 25th April, 1947. (629129.)

11288. Phototechnics, Ltd., and Angold, E. B.—Electrical condenser assemblage and charging circuit therefor. 28th April, 1947. (629189.)

11904. Precision Developments Co., Ltd., and Olah, G.—Differential electric contact devices. 2nd May, 1947. (629328.)

12921. British Thomson-Houston Co., Ltd.—Stabilized synthetic polymers. 13th May, 1946. (629332.)

14523. Bailey Meters & Controls, Ltd.—Electric control apparatus for regulating a variable. 6th June, 1946. (629363.)

14687. Dixon-Bate, B.—Self-sustaining mechanism for electric table lamps, stands and the like. 3rd June, 1947. (629364.)

15276. Mouchel & Partners, Ltd., L. G., and Gerard, P. J.—Water cooling towers. 10th June, 1947. (629368.)

16234. British Thomson-Houston Co., Ltd.—Methods of preparing alkylorthosilicates. 19th June, 1946. (629138.)

16751. Stackpole Carbon Co.—Electrical inductance coil structures. 25th July, 1946. (629195.)

16914. Benbow, B. W.—Travelling electrical contactor. 10th December, 1940. (629376.)

19676. Sylvania Electric Products, Inc.—Glass-to-metal seals. 20th July, 1945. (629387.)

21117. Electrolux Corporation.—Electric motor control systems. 24th January, 1942. (Cognate application 21118/47.) (629390.)

21561. Westinghouse Electric International Co.—Electromagnetic switches. 15th September, 1942. (629392.)

21712. Sperry Gyroscope Co., Inc.—Ultra-high-frequency electrical filters. 24th September, 1943. (629393.)

21907. Askania Regulator Co.—Control systems for electric arc furnaces. 2nd December, 1943. (629394.)

22043. Allis-Chalmers Manufacturing Co.—Lead connection for dynamo-electric machines. 3rd August, 1940. (629147.)

22074. Marconi Instruments, Ltd., and Brockelsby, C. F. — A.c. bridge measuring circuit arrangements. 8th August, 1947. (629395.)

25943. Radio Corporation of America.—Terminal connectors for electrical-discharge devices. 24th September, 1946. (629200.)

27271. Western Electric Co., Inc.—Apparatus for applying annular insulating discs to an electric conductor. 10th October, 1946. (Cognate applications 27272/47 and 27273/47.) (629202.)

28994. McMurdo Instrument Co., Ltd., and Harrison, A.—Electrical plug-and-socket connectors. 30th October, 1947. (629210.)

29123. Plessey Co., Ltd., and Costa, H. da.—Snap-action electric switches. 31st October, 1947. (629214.)

29131. British Thomson-Houston Co., Ltd., Newnan, D. J., and Evans, J. H.—Point contact rectifiers. 31st October, 1947. (629215.)

1948

6331. Sperry Corporation.—Electric signal generators. 19th August, 1941. (Divided out of 629104.) (629150.)

Belgian Overseas Trade

DURING the first half of this year Belgium's external trade in electrical machinery and apparatus resulted in a balance in her favour. Exports were valued at fr. 1,279 million and imports at fr. 978 million.

EXPORTS

Leading items amongst exports, with values in thousands of Belgian francs, were:

Class	January-June 1948 Fr. (000)	January-June 1949 Fr. (000)
Generators, motors and converters weighing over 10 kg. ...	222,759	184,825
Transformers over 10 kg. ...	79,698	117,515
Lamps, metal filament ...	46,244	19,800
Radio valves	46,310	20,050
Radio receivers	114,600	109,600
Telephone apparatus	185,900	273,900
Metal armoured and rubber insulated cable	81,500	51,600
Paper or textile insulated and metal armoured cable ...	5,800	84,600
Unspecified cable	50,800	64,200
Other cable, insulated with rubber or similar material ...	55,500	24,300
Small installation material ...	33,700	56,000

Prominent among Belgium's customers for electrical goods were the Congo, France, Holland and some other European countries.

IMPORTS

Outstanding items among Belgium's electrical imports were (values in thousands of Belgian francs):—

Class	January-June 1948 Fr. (000)	January-June 1949 Fr. (000)
Dynamos, motors and converters weighing over 10 kg. ...	75,450	99,160
Domestic appliances and small tools	64,500	64,000
Lamps, filament...	25,000	16,200
Radio valves	36,280	37,800
Radio receivers	71,500	61,900
Measuring and registering instruments	19,500	23,100
Meters	11,600	26,400
Enamelled wire	23,600	9,100
Automatic switchgear, etc. ...	25,400	23,900

Among the suppliers of Belgium's electrical imports were the United States, France, Switzerland, Holland, Sweden and Britain, while Canada also was represented.

N.E. Rural Supplies

SINCE the North Eastern Electricity Board came into operation in April last year, 53 villages and 380 farms have been supplied with electricity, but there are still 236 villages without a supply. These figures have been given in a report issued by the Board. Work is in hand on the electrification of a further 27 villages. There are now 3,901 farms connected.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—10th November. Administration General of Waterworks. Electric pumping sets, diesel pumps, generating sets, venturi meters, bridge cranes and transmission and receiving equipment. (C.R.E. (I.B.) 27090/49. Ten/49.)*

Ashford (Kent).—22nd October. U.D.C. Street lighting equipment. (See this issue.)

Belfast.—28th October. Electricity Department. Fire-extinguishing equipments. (See this issue.)

Belgium.—CITY OF ANTWERP.—8th December. Supply of twelve electric cranes. (C.R.E. (I.B.) 18001/49. Ten/671.)*

Cheshire.—15th October. The County Council invites applications from firms wishing to be considered for placing on the new list of approved contractors to be invited to tender for works up to £1,000 in value (electrical works). District architect, Remenham, Alderley Road, Wilmslow.

Coventry.—7th October. City Housing Committee. Electrical installations in 128 houses. (30th September.)

Lancashire.—8th October. County Council. Electrical installation at Hutton Houses Rest School. (30th September.)

Marple.—18th October. U.D.C. Street lighting equipment. (30th September.)

New Zealand.—WELLINGTON.—31st January. State Hydro-Electric Department. Four 3,333 kVA transformers. (C.R.E. (I.B.) 23791/49. Ten/618.)*

WELLINGTON.—7th February. State Hydro-Electric Department. One 12,000 kVA, 11 kV, 3-phase tap-changing on-load voltage regulating transformer. (C.R.E. (I.B.) 26225/49. Ten/662/I.B.I.)*

New Zealand.—WELLINGTON.—14th February. Twelve single-phase transformers. (C.R.E. (I.B.) 26936/49. Ten/680.)*

South Africa.—PORT ELIZABETH.—3rd November. Supply of eleven miles of l.v. cable. (C.R.E. (I.B.) 26949/49. Ten/684.)*

DURBAN.—2nd December. City Electricity Department. 33 kV cable, pilot cable and joints. (C.R.E. (I.B.) 25882/49. Ten/668.)* 9th December. 33 kV transformers. (C.R.E. (I.B.) 25989/49. Ten/669.)*

*Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Burnley.—Corporation. Recommended. Electrical installation work at schools: Stoneyholme Infants' (£351).—North Western Electricity Board. Myrtle Bank Nursery (£475).—Simpson Bros.

Northumberland. — Education Committee. Electrical work at schools, etc.:—Newbiggin West county primary (£319).—Mood & Sons, Alnwick Castle (£357).—I. & E. Morton. Acomb county primary (£150).—O. R. Porteous. Newburn Bell's Close R.C. (£120).—Falconar, Cross. Newburn Throckley (£321).—J. W. Gibson.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Amble (Northumberland).—Block of houses and flats for old people; surveyor.

Boldon.—Houses (100) for the U.D.C.; N. Hindmarch, surveyor.

Bolton.—Houses and flats (54), in three sections; housing director, Town Hall.

Bushey.—Houses and flats (42), Highwood Avenue, for U.D.C.; surveyor, Council Offices, Rudolph Road.

Carlisle.—Kitchen dining rooms at Grammar School, St. Patrick's School and Newtown School; city engineer, 18, Fisher Street.

Chesterfield.—Large garage, workshop, washing bays, paint and joiners' shop, heating chamber, etc., for new cleansing garage, Sheffield Road, Stonegravels; R. Clegg, town clerk, Town Hall.

Clun.—Additional houses (28); R.D.C. surveyor.

Coventry.—Junior school and infants' school, with dining rooms, kitchens, etc., Wyken Croft; W. L. Chinn, director of education, Council House.

Cumberland.—Rural police station at Irthington; county architect, 15, Portland Square, Carlisle.

Derby.—Dining room and kitchen, Nightingale Road School; T. W. East, borough architect, The Council House.

Devon.—Canteen kitchen and dining room at schools at Chagford and Chulmleigh; H. V. de Courcy Hague, county architect, Heavitree Road, Exeter.

Dorchester.—Garage, showrooms and offices, Trinity Street; Lee Motors, Ltd., Bournemouth.

Exeter.—Modern school for girls, Priory estate, Topsham Road; H. B. Rowe, city architect, Municipal Offices.

Fakenham.—Additions to Grammar School, including classrooms, laboratory, library, art room, shower baths, etc., for Norfolk E.C.; W. O. Bell, chief education officer, Stracey Road, Norwich.

Hebburn-on-Tyne.—Further 60 houses for U.D.C.; Page, Son & Hill, architects, 75, King Street, South Shields.

Technical college, Victoria Road West, and grammar technical school, Mill Lane; county architect, Court Lane, Durham.

Ipswich.—Temporary offices, Rope Walk, for East Suffolk C.C.; E. J. Symcox, county architect, Ipswich.

Jarrow.—Office additions, Grange Road, for Jarrow Permanent Building Society; G. C. Young, architect, 12, Grange Road West, Jarrow.

Block of 84 flats; H. W. T. Perkins, borough engineer.

Cinema, on Corporation housing estate, for Dawe Brothers, Ltd., 73, Westgate Road, Newcastle-on-Tyne.

Kirkcaldy.—New wing, municipal buildings, Wemyssfield (£81,000); Carr & Howard, architects, 110, Old Brompton Road, London, S.W.7.

Longbenton.—Houses (20), Taylor Avenue, Wideopen, for U.D.C.; A. E. Sweetman, surveyor, Council Offices, Forest Hall, Newcastle-on-Tyne.

Ludlow.—Houses (28), Sandpits Road; S. N. Shrimpton & Son, architects, 5, Castle Street.

Manchester.—Adaptations and alterations to St. Joseph's Buildings, Longsight, to form police divisional headquarters; P. B. Dingle, town clerk, Town Hall.

Market Drayton.—Infants' school, for Shropshire E.C.; Hobbiss & Hobbiss, architects, 36, Waterloo Street, Birmingham, 2.

Middlesbrough.—Rebuilding shops, Sussex Street; H. S. Simon & Co., solicitors, Albert Road, Middlesbrough.

Clothing factory and showroom for Elite House (Middlesbrough), Ltd.; T. A. Crawford, architect, 80, Borough Road.

Newcastle-on-Tyne. — Twelve bungalows, Longbenton estate, for the City Council; W. H. Oliver, Ltd., builders, West Road, Newcastle-on-Tyne.

Northampton. — Houses (91), Dallington Fields estate, Section 4a, for Housing Committee; borough architect, Guildhall.

North Riding.—Twelve police houses at Northallerton; county architect, Northallerton.

Northumberland.—County primary school, Longbenton (£166,000); J. W. Urpeth, builder, Bedlington.

Nuneaton.—Houses (74), Coldwell estate; G. Ashton, borough surveyor, Council House.

Oldbury.—Houses (48), Titford estate; J. Ashmore, Ltd., builders, Bromford Lane, West Bromwich.

Oxford.—Infants' school at Barton (£52,175); E. G. Chandler, city architect, Town Hall.

Peterlee (Co. Durham).—Houses (86) for the Peterlee Development Corporation; chief architect, Peterlee.

Portsmouth.—Houses (52), Leigh Park; city architect, City Council Chambers, 1, Clarence Parade, Southsea.

Reading.—Junior and infants' primary school, East Caversham; E. G. V. Hives, architect, 3, Cork Street.

Rochdale.—Junior school and infants' school, Kirkholt estate; G. F. Simmonds, town clerk, Town Hall.

Rutherglen.—Erection of buildings in Dalmarnock Road (£138,000); Stewart & Lloyds, Ltd., tube manufacturers.

Scarborough. — Houses, Seamer; builders: F. C. Heptinstall (34 houses), H. Newlove (18), Lee Bros., Ltd. (14), and Mollekin Bros. (112).

Stamford.—Houses (52), Drift Road site; F. J. Lenton & Partners, architects, 16, Broad Street.

Thornaby-on-Tees.—Houses (32) for T.C.; direct labour.

Thurrock.—Offices for Estates Department, Whitehall Lane, Grays, for U.D.C.; surveyor, Palmers Avenue, Grays, Essex.

Tynemouth.—Houses (60), Marden central area; borough engineer, 19, Howard Street, North Shields.

West Kesteven.—Houses (66), on nine sites, for R.D.C.; F. J. Lenton & Partners, architects, 16, Finkin Street, Grantham.

West Hartlepool.—New Woodlands R.C. secondary grammar school, Brierton county secondary school, and primary school at Owton Manor; S. M. Richmond, borough architect, Municipal Buildings.

Whitehaven.—Additions to Galemire Hospital; H. B. Stout, architect, 6, Scotch Street.

Widnes.—Houses (74), Hale Road; T. A. Brittain, borough architect, Brendan House, Widnes Road.

Worsley.—Houses (72), and 16 flats, Mount Skip site, Little Hulton, for U.D.C.; H. Lomax, clerk, Town Hall, Walkden, Manchester.

Canadian Water Power

SPEAKING at the American Institute of Chemical Engineers' Convention, Dr. H. Massue said that hydro-electric horse-power per capita in Canada was five times the proportion in the U.S. In Quebec Province, the average revenue per kWh sold of just over a third of a cent was probably lower than in any other part of the world.

Of the 45 hydro-electric plants in North America with an installation exceeding 150,000 h.p., twelve were in Quebec, and only two exceeded the 1,200,000 h.p. plant on the Saguenay. Mr. P. E. Radley, assistant general manager of the Aluminium Co. of Canada, revealed that in 1948 16 per cent of all the hydro-electric power generated in Canada was used for the production of aluminium. The industry was now sixth in dollar value on Canada's export list.

Winnipeg River Development

When the Pine Falls dam and power plant in Manitoba are completed the upstream level of the Winnipeg River will be raised 37ft. This will result in the disappearance of the short rapids at Pine Falls, and also of Silver Falls, one of Manitoba's main tourist attractions. The river at present is only 700ft wide where the dam is being constructed, but the rise in level will make it necessary to build a 2,000ft-long dam. At the present rate of progress the new 85 MW plant should be in commission by the autumn of 1951.